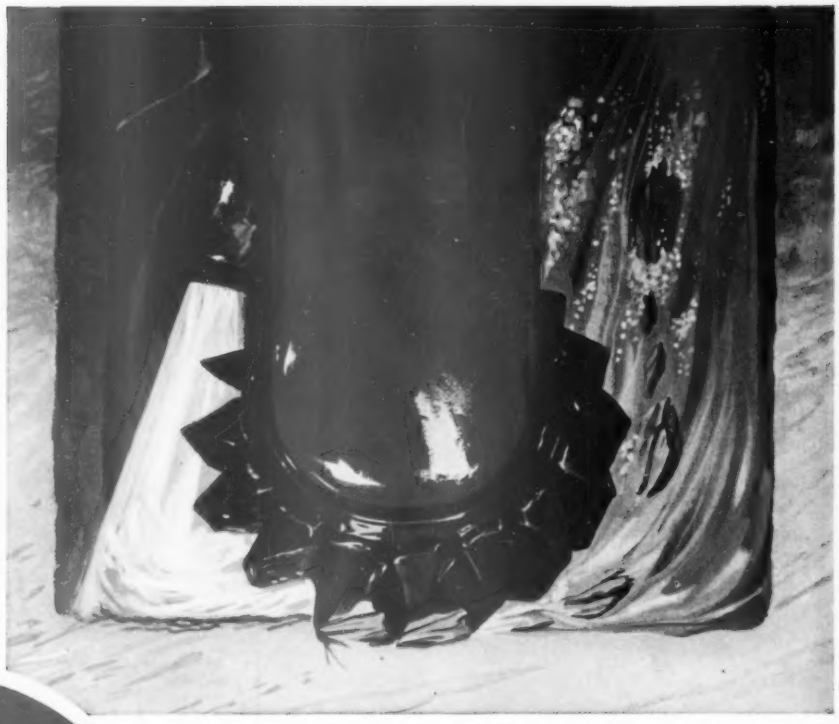
the OIL AND GAS JOURNAL

Better bottom hole cleaning---

means more hole per bit!



REED
TWIN-BLAST
ROCK BITS

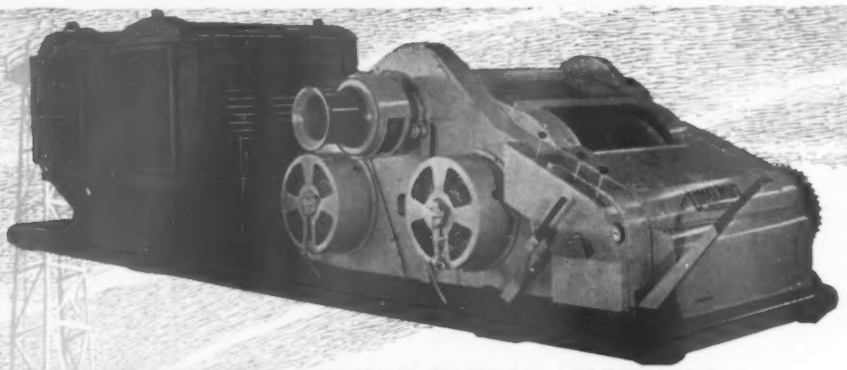
REED Twin-Blast slush nozzles aim high-velocity streams of fluid directly at the bottom of the hole—blasting cuttings up into the return mud stream as quickly as they are chipped loose to let cutter teeth take a full "bite" on new formation.

The result—when correct mud velocities are supplied—is faster drilling, more hole per bit, fewer round trips and lower drilling costs.

REED ROLLER BIT COMPANY
HOUSTON 1, TEXAS

4106

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 **APRIL 20, 1953**



A SALES RECORD THAT *PROVES* ACCEPTANCE

Since the U-34 was introduced in April, 1948, over seventy of these models have been put into operation. Approximately 30% of the units sold were reorders by satisfied users. Where can you find an acceptance record as good as this for a brand new drawworks?

SPECIAL FEATURES OF THE U-34 AND U-34D

VERSATILITY — Single or double-drum models. One or two engines. One package unit or split-rig unit make for many combinations to suit your individual needs.

SPEED — Fast operating combination because each engine is equipped with a torque converter which allows each engine to reach high speeds QUICKLY where maximum Horse Power is attained.

SAFETY and SIMPLICITY — All controls designed for the convenience of the operator. Self-energizing, fully equalizing, one point adjustable brakes. Self-cooling Air-O-Matic clutch requires no adjustment. One-lever control for all drum speeds. Unique design of control and drum clutches practically eliminates clutch failure.*

PORTABILITY — Designed so drawworks and power unit may be transported in one load, thus reducing moving costs and time.

*One set of clutches shows slight wear after 90,000' of drilling. To March, 1951 only one clutch failure —caused by low air pressure.

UNIT RIG & EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

DESIGNED FOR THE JOB....

UR-514

UNIT RIG DRAWWORKS ARE SOLD EXCLUSIVELY THROUGH THESE AUTHORIZED DISTRIBUTORS IN THE USA AND CANADA

Howard Supply Company — Iverson Supply Company — Mid-Continent Supply Company
Houston Oil Field Material Company — Jones & Laughlin Steel Corp., Supply Div. — Lucey Products Corporation
Merwell-Wilder Supply Company — Howard Supply Company — Oil Well Supply Division, United States Steel Co.

EXPORT SALES — Midcontinent Supply Company, 42 Broadway, New York City. — Cable: MIDUNITRIG

the OIL AND GAS JOURNAL

APRIL 20, 1953 VOL. 51 NO. 50

OIL IN THE NEWS . . .

Climax Expected Shortly in Widespread Controversy Over Imports .. 98
Expansion of Lube Capacity Questioned at NPA Meeting 99
Spencer Asks Change in Antitrust Laws to Permit Defense Cooperation 100
Imports Dropped, Exports Increased in February, Study Shows 100
Gas Expansion in Next 5 Years to Cost $5 Billion, Smith Predicts 101
Stocks of Major Products Register Decline 102
New Instrument Provides Continuous Measurement of Viscosity 103
First Use of Turbines on Major Gas Line Indicates Promising Future .. 104
Gulf's Rank Wildcat Near Pecos Sets West Texas Drilling-Depth Record 105
Rancho Dedicates 457-Mile West Texas-to-Gulf Crude-Oil Pipe Line .. 106
Shell Assumes First Place in Company-Operated Output in California .. 107
Crude-Oil Imports Into California to Be Higher This Year Than Last .. 108
Civil Suit to Be Filed April 21 in "Oil Cartel" Case 111
Eisenhower Urges Sale of Government's Synthetic-Rubber Plants 112
Japanese Tanker Takes on Cargo of Products at Abadan 114
More Capacity for Producing Avgas Needed in Europe, Warren Says .. 114
Construction Half Complete on Shell's Melbourne Refinery 115
New Ganso Azul Firm Maps Plans for Operations in Peru 117
New Mexico Bevonian Oil Steps Out 199
Denver-Julesburg Having Biggest Year 200

NEWS FEATURES . . .

They Say 83
Calendar of Events 87
Journally Speaking 93
Editorial 95
This Week 97
Watching Washington 112
International News 114
Personals 118
Deaths in the Industry 121
Pipe-Line News 187
Refining News 193
Drilling Contractors 190
Natural-Gas News 197
Natural-Gasoline News 197
Areal Field Reports 203
Exploration Statistics 225
Production Statistics 226
Refining Statistics 227
Market Statistics 228

TECHNOLOGY AND OPERATION . . .

Contractor "Packages" Big Rig for Mobility 122
By Roy F. Carlson
Three Years of Operation at Carter's Billings Refinery 124
[1]New Light on Use of Bentonite in Cements 131
[2]Infrared Analyzers Improve Processing Operation 136
By D. E. Berger
Good Weight Distribution on New Workover Barge 143
[3]Progress Report: Mitigation of Pipe-Line Corrosion 148
By Gerald L. Farrar
[4]Construction of Rancho Pipe Line 154
By Paul Reed
[5]Pump Stations of Rancho Pipe Line 156
By Paul Reed
Well-Elevation Services and How They Operate 158
By C. Malcolm Davis
On the Job . . . In the Fields 161
Engineering Reference Section 162-173

DEPARTMENTS . . .

On the Job—Fields 161
Engineering Reference 163
Heat Transfer 164
Refiner's Notebook 165
Questions on Technology 167
Instruments 169
Engineering Fundamentals 171
Modern Drilling 173
Equipment Men in News 174
Pipe-Line Construction 178
Active Rotary Rigs 192
Classified Advertising 229
Advertisers' Index 233

In Brief . . .

1. NEW LIGHT ON BENTONITE . . . Laboratory data and extensive field experience show that the properties of cements containing 8 to 12 per cent bentonite are satisfactory for use in wells with formation temperatures ranging from about 100° to 250° F. By varying concentration of calcium lignosulfonate with depth, these cements have been used successfully in several thousand wells during the past 4 years. Advantages are (1) low density of slurries, (2) low set strength, (3) better squeeze-cementing results, (4) savings of 15 to 25 per cent on the cost of cementing materials.

•

2. BETTER PROCESSING . . . Products from processing plants must meet certain specifications, and the process variables which are measured and controlled are but a means to that end. The end itself is product composition. When chemical and physical laboratory analyses, made on an intermittent basis, must be relied on for product analyses, product quality often suffers due to the necessary time lag before off-specification material is detected. Infrared analyzers may be used in a number of petroleum processing operations, thereby giving a continuous record of product quality.

•

3. CORROSION MITIGATION . . . Engineers frequently overlook one or two of the basic factors of design for current-carrying rectifiers in cathodic protection systems: (1) ability to meet environmental conditions, and (2) conformance to Kelvin's economic law. Necessity for cathodic protection of pipe lines in soils with resistivities at pipe depth from 20,000 to 1,000,000 ohm-cm. is shown by a long-line current survey. Data indicate at least four hot spots per mile over an 835-mile line; leak record bears out this survey.

•

4. FAST PIPE-LINE CONSTRUCTION . . . The 457-mile, 24-in. crude-oil pipe line of Rancho Pipe Line System was built within one calendar year, from McCamey in West Texas to Houston. Line was protected with two coats of enamel, reinforced by glass mat, and wrapped with asbestos felt.

•

5. WELL-DESIGNED PUMP STATIONS . . . The three Rancho Pipe Line stations incorporate advanced design features in every respect. Main-line pumps are high-capacity centrifugals, operating at 340 psi. differential pressure. Centralized control, with full protection for operation abnormalities, is provided for each station. Buildings are of brick-and-steel construction.

You can Pick the Power to fit the Pump

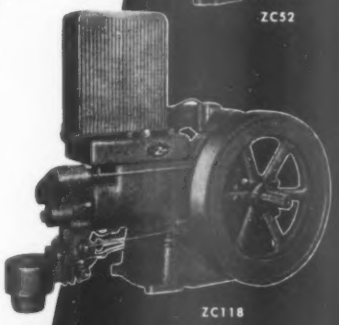
with the "ZC"

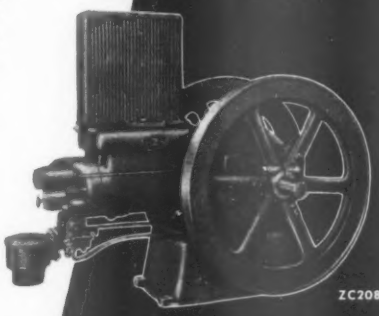
Because the Fairbanks-Morse line of "ZC" Engines is so broad, you can pick the size that will best fit your pumping requirements . . . from 3 to 30 hp.

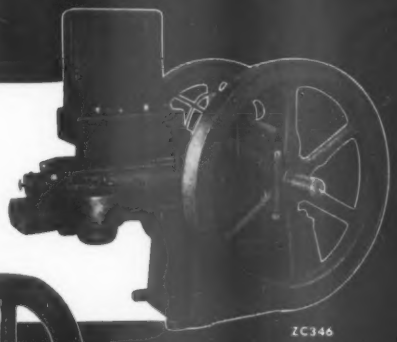
Fairbanks-Morse "ZC" Engines are high displacement, slow-speed, heavy-duty models . . . the ideal type for oil field pumping service. They are economical to operate and maintain . . . simply designed to eliminate need for complicated parts and delicate adjustments. And, *all* have the famous extra heavy, double flywheels that assure smooth, efficient performance . . . with the drive on either side of the engine.

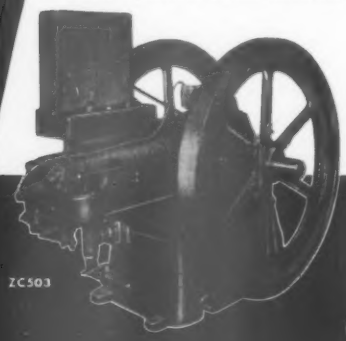
For all the facts, see your local supply store or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

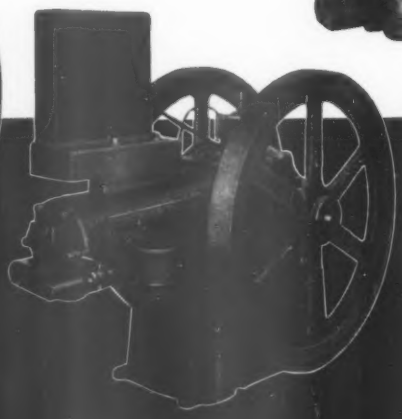
ZC52


ZC118


ZC208


ZC346


ZC503


ZC739

FAIRBANKS-MORSE,

a name worth remembering

OIL FIELD EQUIPMENT • PUMPS • SCALES • ELECTRIC MOTORS • GENERATORS • LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES • MAGNETOS • DIESEL LOCOMOTIVES

Now Available

Samples of New Du Pont Fuel Oil Additive No. 2

Fuel oil stabilization has often proved difficult and expensive since the usual oxidation inhibitors used in gasoline, greases and lube oils have little effect on fuel oils.

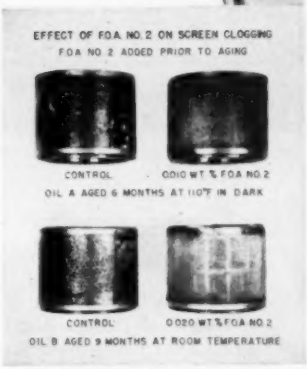
Because fuel oils can cause filter screen clogging, stabilizing them is important from a customer relations as well as quality standpoint.

If you have such a stabilizing problem, the chances are that Du Pont Fuel Oil Additive No. 2 can help solve it. This new ashless additive was developed especially as a dispersant and stabilizer for distillate fuel oils. Being highly effective, it gives desired results at low cost.

TO PREVENT CLOGGING, Fuel Oil Additive No. 2 not only acts to retard the formation of insoluble residues, but also reduces the particle size of those insoluble residues that are formed.

Through use of the new additive, catalytic cracked stocks of the proper boiling range can be blended with straight-run products at no sacrifice in the field performance of the blend. This helps to increase yield and flexibility.

SAMPLES of Du Pont Fuel Oil Additive No. 2 are available for testing in your own stocks. Any Du Pont Petroleum Chemicals Division representative or district office will be glad to supply you.


EFFECT OF FOA NO. 2 ON SCREEN CLOGGING
FOA NO. 2 ADDED PRIOR TO AGING
CONTROL
0.010 WT. % FOA NO. 2
OIL A AGED 6 MONTHS AT 110°F IN DARK
CONTROL
0.020 WT. % FOA NO. 2
OIL B AGED 9 MONTHS AT ROOM TEMPERATURE

THESE FOUR FILTER SCREENS show clearly the improvement in two oils to which Du Pont Fuel Oil Additive No. 2 has been added.

DU PONT
REG. U.S. PAT. OFF.

Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

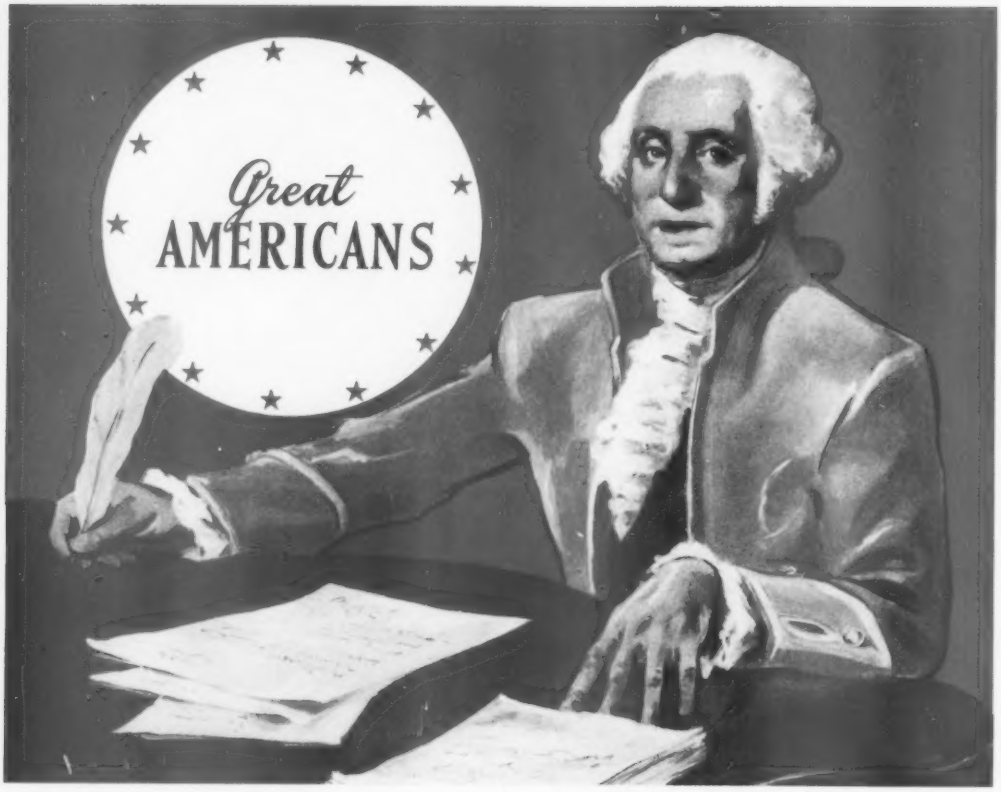
E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • Wilmington 98, Delaware

District Offices: New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

District Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

IN CANADA: Canadian Industries Limited—Toronto, Ont.—Montreal, Que.—Calgary, Alta.

The Oil and Gas Journal, published Mondays, copyright 1953, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.

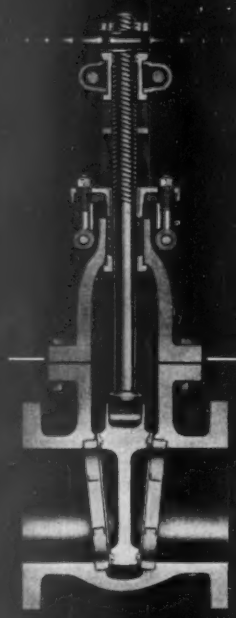


"To be prepared for war is one of the most effectual means of preserving peace."
—George Washington (1732-1799)

AMERICAN PUMPING UNITS ARE GREAT performers under every oil field condition. Today there are thousands of American Pumping Units in the field pumping profitably... some that have been on the job continuously for 15 years and longer. You can cut pumping costs with American units. Write for Catalog 151 giving specifications on the complete American line. Contact your favorite supply store or our nearest office.

AMERICAN
MANUFACTURING COMPANY OF TEXAS
FORT WORTH 11, TEXAS

Branch Offices: HOUSTON—KILGORE—ODESSA—TULSA



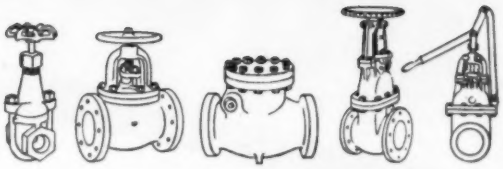
IRON

COMPLETE LINES OF IRON VALVES AND PIPE FITTINGS are manufactured by Walworth in a variety of types, pressure ratings, sizes, and patterns for general industrial use.

Walworth also manufactures complete lines of valves (including Lubricated Plug Valves), and pipe fittings made of steel, bronze, and special alloys.

These valves and pipe fittings, plus Walworth-made pipe wrenches total approximately 50,000 items and are sold through distributors in principal centers throughout the world.

Walworth engineers will be glad to help you with your problems. For further information call your local distributor, nearest Walworth sales office, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, New York.



Iron valves in gate, globe, angle, check, and lubricated plug types are manufactured by Walworth. Illustrated is a sectional view of a Walworth No. 726F Standard Iron Body, Bronze Mounted, Wedge Gate Valve with flanged ends. This line of valves is available in sizes 2 to 30 inches. Similar valves of All-Iron type are also available.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

JONES SUCKER RODS

We invite you to examine and compare the threads and make-up of the Jones Joint. We know you will agree that, today, these rods and couplings are the strongest and finest in any field. Why accept less than the best?

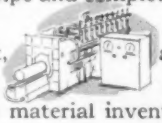
PESA

THE S. M. JONES COMPANY
Division of Buffalo-Eclipse Corporation
General Office and Factory: TOLEDO, OHIO
Sales Office: Kennedy Building, Tulsa, Okla.
Export Sales Office: Buffalo International Corp.
50 Church Street, N. Y. C.

LOOK FOR THE GREEN RODS

Your WATCHDOG COMMITTEE on COSTS will approve

SHOP FABRICATION OF PIPING

because . . . both quality and economy are guaranteed. Piping is fabricated in Grinnell shops under ideal conditions, with modern equipment, by personnel qualified in all classes of work. Price (determined in advance) includes competent engineering, scheduling and shop sketches, efficient material procurement. Grinnell supplies heat, light, power, water, compressed air, expendable tools and supplies. Grinnell shops have large storage areas for pipe and completed assemblies, expensive modern equipment,  a permanent staff of skilled workers. Grinnell finances material inventories and payrolls; carries insurance. The customer pays for no waste material or spoilage. Shop fabricated piping is rigidly inspected and tested to meet exacting requirements of customer's specifications and applicable codes. It is cleaned inside and outside and painted. Squared to standard dimensional tolerances, sub-assemblies are erected at the job site more quickly and easily. It all adds up to this . . . shop fabrication by Grinnell guarantees quality and economy.

Write for complete facts.

GRINNELL

WHENEVER PIPING IS INVOLVED

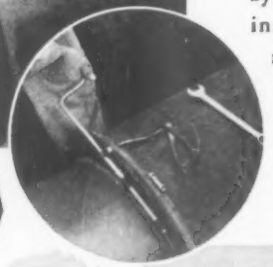
Grinnell Company, Inc., Providence, Rhode Island • **Coast-to-Coast Network of Branch Warehouses and Distributors**

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves • Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies • industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

A tested and proven design for efficient pipeline protection. . . . More than 18,000 crossings equipped since 1950. . . .

Williamson
CONCENTRIC-SUPPORT INSULATORS

Provide low-cost, dependable protection for right-of-way crossings . . . Simple to install with a common wrench . . . Impervious to pipe coatings . . . Support blocks center pipe in casing, spacer blocks provide clearance through casing . . Available for all combinations of pipe and casing diameters.



TYPE "L" WmSEAL CASING BUSHINGS

Provide a water-tight seal even under the worst conditions of out-of-round casing . . . Unaffected by dirt, moisture or backfill during or after installation (no dope, adhesive or shield required) . . . Electrical insulation of pipe from casing provides economical cathodic protection.

Easily installed with common hand tools.

Write for Bulletin 249-A

VISIT US AT THE IPE—
BOOTHS 28-29
OKLAHOMA BUILDING
TULSA—MAY 14-23

T.D. Williamson, Inc.

THE PIG WITH THE POKE
CLEANS PIPE LINES

P. O. BOX 4038
TULSA 9, OKLAHOMA

REPRESENTATIVES

CANADIAN EQUIPMENT SALES & SERVICE CO., LTD.
Edmonton, Calgary, Toronto, Canada

LANGLEY y CIA
Buenos Aires, Argentina

TOD PAZDRAL, Houston 5, Texas

KERR ENGINEERED SALES CO.
PIGS & TAPPING MACHINES
Pittsburgh 22, Pennsylvania

H. E. DAVIS
Los Angeles, Calif.

STUART STEEL PROTECTION CORP.
BUSHINGS & INSULATORS
Kenilworth, N. J.

BEN W. BRUNDAGE COMPANY
Oakland 11, California

PHILIP H. MOORE, Durban, Natal, South Africa

JAMES S. KONE CO.
Amarillo, Texas

HAMMOND IRON WORKS
KEYES TANK DIVISION
Casper, Wyoming
Provo, Utah

EASY HANDLING— FULL FLOW— TROUBLE-FREE OPERATION—

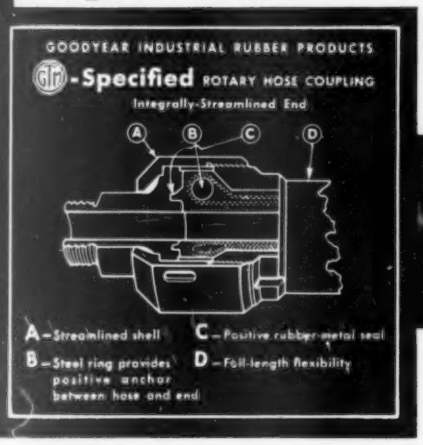
You get ALL THREE with the Exclusive Goodyear Rotary Hose Coupling that's Oil Field Designed

The exclusive Goodyear integrally-streamlined Rotary Hose connection was designed by the G.T.M.—Goodyear Technical Man—to meet rigid oil field specifications. They include full free flow, full-length flexibility of hose, and excellent abrasion resistance—reasons why this connection is giving long, dependable, trouble-free service even under most difficult conditions.

Ask the G.T.M. for details, see your nearest Goodyear Distributor, or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Coupling in service. Note absence of projecting clamps.

FINAL INSPECTION at plant. Parts from top to bottom are adapter (note thread protector), shell, retainer.



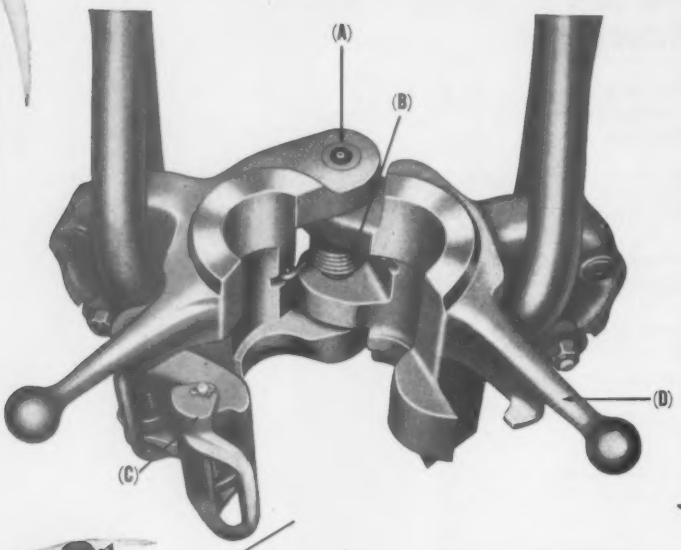
YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

WORLD'S BEST ELEVATOR

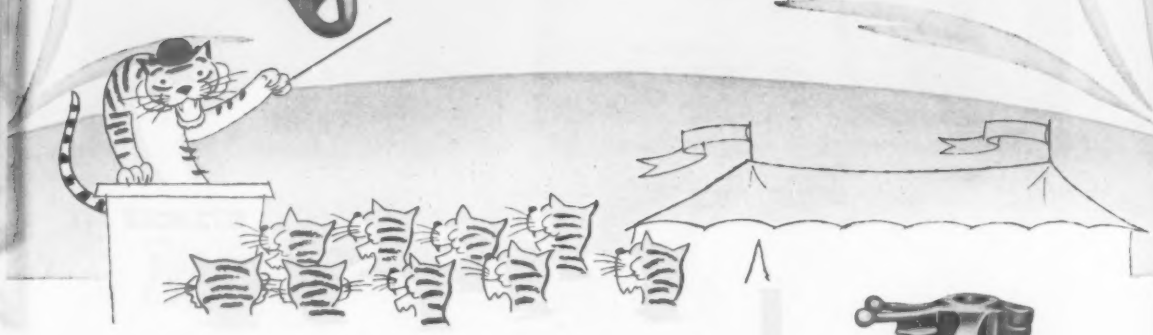


(A) This fitting (safely recessed in the hinge pin) permits proper lubrication to ensure easy opening and closing of elevator.

(B) This spring opens the elevator and forces it off and away from the pipe.

(C) The safety lock closes automatically with the latch; and one easy motion opens both lock and latch.

(D) Guards on handle protect hands from injury against the links.

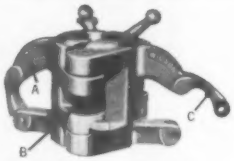


The *exclusive* features shown above are sufficient to make the Web Wilson "Balanced" Center Latch Elevator the WORLD'S BEST—and the choice of fast-moving, safety-minded crews—but there are **OTHER IMPORTANT FEATURES!** Remember that these "Balanced" elevators are made from Manganese-Molybdenum steel, properly heat treated—all pipe contacting surfaces are flame hardened to wear a long, long time—and see other advantages at right.

FOR ALL TYPES AND SIZES OF DRILL PIPE. Web Wilson "Balanced" Center Latch Elevators are available for Regular and External Upset "Collar Type" drill pipe, and also for "Bottleneck" (18-degree taper) drill pipe. Made in 12 sizes to handle drill pipe and tubing from 1¼" to 7".

YOUR supply store has Web Wilson "Balanced" Center Latch Elevators in stock—or can get one for you—pronto!

The slanted hinge pin, which provides automatic closing, is clearly seen above.



A–Rugged Link Arms fit links perfectly.
B–This spring opens the elevator and forces it off and away from the pipe.
C–Link Arms are easily operated, but are securely locked in place.

WEB WILSON

Oil Tools INC.

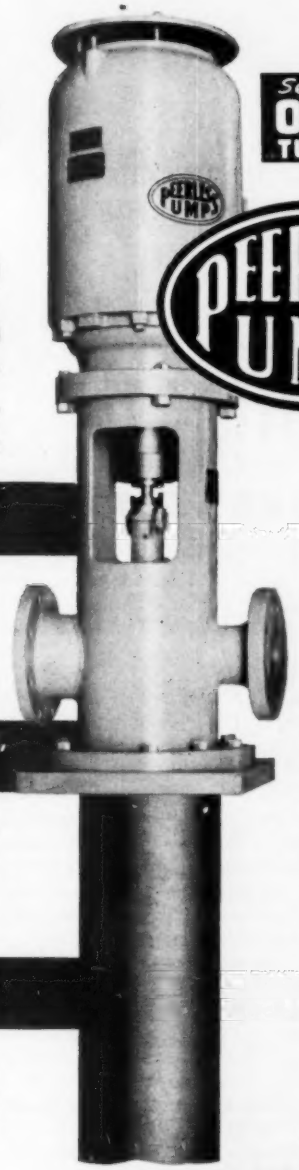
FIELD PROVEN

LOS ANGELES, CALIFORNIA • HOUSTON, TEXAS • NEW YORK, N.Y.

HERE ARE 3 BIG REASONS *why* The PEERLESS HYDRO-LINE

ENCASED CLOSE-COUPLED PUMP

IS BEST SUITED TO MANY REFINERY AND FIELD PROCESSING APPLICATIONS



See Our Exhibit
OIL SHOW TULSA MAY 14-23

PEERLESS PUMPS

SPACE-SAVING AND COST-SAVING IN INSTALLATION...

Because of its vertical design the Peerless Hydro-Line pump occupies a small amount of floor space. Pre-assembled into a compact, integral unit, including driver, it can be uncrated and put on stream in minimum time and with a minimum of installation expense. Removal for inspection is accomplished without disturbing piping. Suction and discharge flanges are made to your standards.

CONSTRUCTION FLEXIBILITY MEETS FUTURE, AS WELL AS PRESENT SYSTEM NEEDS...

The vertical, multi-stage, turbine type construction of the Hydro-Line pump permits economical and quick installation of additional pump stages (bowl and impeller units) should future system demands exceed those of the installation for which the pump was initially installed. Further, removal to another location is expedient with Hydro-Line's type of construction.

EXCELLENTLY ADAPTED TO SYSTEMS WITH LIMITED NPSH...

With ordinary pumps, available NPSH is frequently insufficient for optimum operation. The Peerless Hydro-Line, multi-stage vertical turbine pump is especially designed for low available NPSH conditions. It is ideal for condensate return service and for pumping petroleum hydrocarbons, refrigerant mixtures and dilute alcohols.

HYDRO-LINE CHARACTERISTICS AT A GLANCE

APPLICATIONS
Especially suited for pumping hydrocarbons, such as gasoline, butane, propane, hot oils, etc. hot or cold water, mild acids, bases, salt solutions.

CAPACITIES
Up to 5000 gpm

HEADS
Up to 1500 feet

TEMPERATURES
From 0°F to 400°F

PRESSURES
Working pressures to 500 psi.

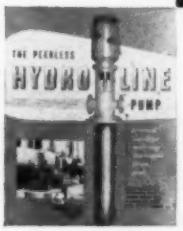
DRIVES
As required, standard vertical, solidshaft, hollowshaft or explosion-proof motors; steam turbine.

SEALING CHAMBER
Peerless mechanical shaft seal standard construction or packing gland furnished as required.

MATERIALS
Cast iron bowls, bronze impellers, #416 stainless steel shaft standard; any special materials can be furnished on order to suit individual requirements.

WRITE FOR BULLETIN— Use the coupon at right to obtain your copy of Peerless Bulletin No. B-592-1, which describes and illustrates the successful and exacting design, construction and performance characteristicts of the Hydro-Line pump.

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORP.
Address inquiries to Factories at: Los Angeles 31, California and Indianapolis 8, Indiana. *Offices:* New York, Chicago, St. Louis, Atlanta, Tulsa, Plainview and Lubbock, Texas; Fresno, Los Angeles, Phoenix, Albuquerque, New Mexico.
Distributors in Principal Cities; Consult your Telephone Directory



MAIL COUPON FOR BULLETIN

PEERLESS PUMP DIVISION
Food Machinery and Chemical Corporation
301 West Avenue 26
Los Angeles 31, California

Please send a copy of Peerless Hydro-Line Pump Bulletin No. B-592-1.

NAME_____

COMPANY_____

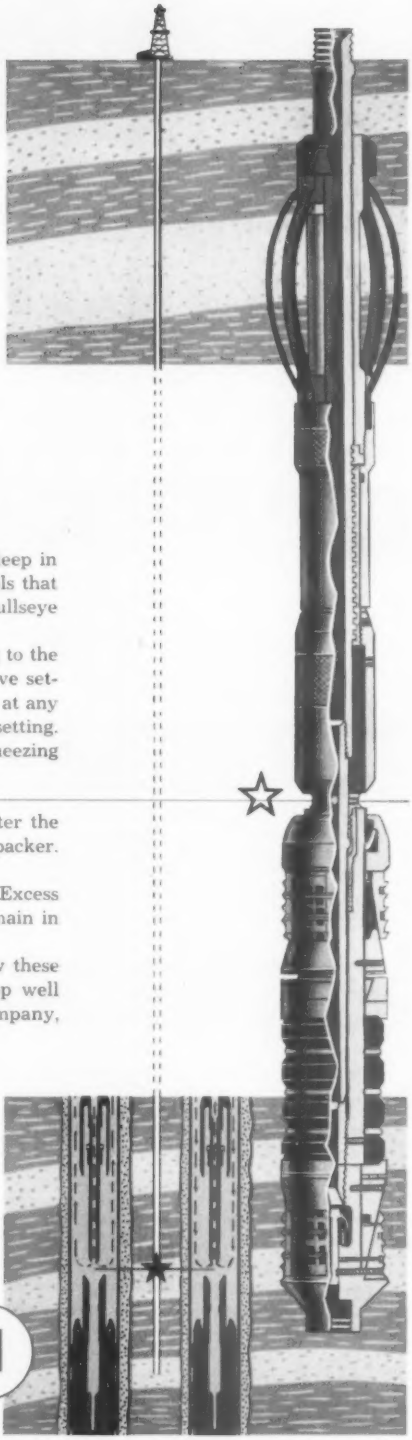
STREET_____

CITY_____ STATE_____

O&GJ

PRECISION SQUEEZING
FOR SUPER-DEEP HOLES

HALLIBURTON'S DM AND DC SQUEEZE PACKERS



High pressure, extreme temperature, and heavy drilling mud deep in the earth call for superior tools to squeeze successfully. The tools that meet these challenging requirements... and do the job with bullseye accuracy... are Halliburton's DM and DC Squeeze Packers.

Their operation, like their design, is simple. Rotation of tubing to the right before picking up on the Squeeze Packers provides positive setting. Packers remain open until set and can circulate or reverse at any time while being run in. There are no threads to unscrew after setting. And tubing and circulation valves are free from packer before squeezing begins.

To squeeze, tubing is lowered so circulation valve can re-enter the packer. Two seals form between end of circulating valve and packer. This prevents cement from leaking out through the top.

After completion, tubing and circulation valve are withdrawn. Excess cement is reversed out, leaving packer to be drilled out or remain in the well as a permanent bridge plug.

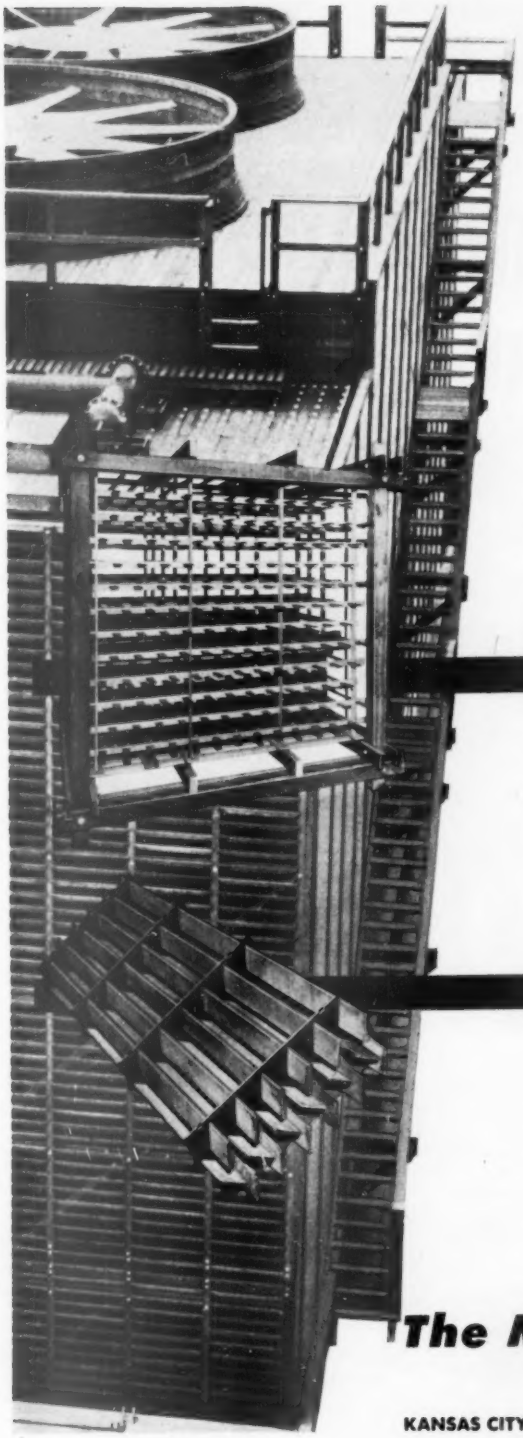
Your nearby Halliburton representative has the facts on how these important tools can cut costs and serve you efficiently in deep well squeezing. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

DM... drillable magnesium alloy for squeezing and temporary bridge plug.

DC... drillable cast iron for squeezing and permanent bridge plug.

HALLIBURTON

YEARS AHEAD IN ADVANCED CEMENTING TECHNIQUES



MARLEY design features that mean GUARANTEED PERFORMANCE

What cooling tower purchasers actually buy is ability to meet specific operating conditions. Sturdiness of structure and mechanical excellence dictate the life of the tower, but design alone affords the inherent ability to provide the necessary heat dissipation each process requires. That's why every Marley cross-flow tower is guaranteed to deliver design performance at all times, for only Marley cooling tower design incorporates such advanced features as:

MORTISLOCKED FILLING

This patented Marley filling breaks up the water at every six inches of fall and affords surface retention for longest air-water contact far greater than any other type filling. It achieves this top efficiency while offering absolute minimum obstruction to air flow. Add it up: most frequent water break-up *plus* greatest surface air-water contact *plus* lowest static pressure . . . and you have *peak performance.* MortisLocked filling has no corrosive fasteners to rust or corrode. It can expand and contract freely without warping or sagging.

TRIPLE-EFFECT DRIFT ELIMINATORS

Originally designed by Marley, triple-effect drift eliminators can be used with true efficiency only in Marley cross-flow towers. Position in the tower is of utmost importance for this type eliminator. As an integral part of Marley design, it is placed to best advantage to eliminate the largest quantity of moisture from entrained air without creating undue pressure drop. Marley cross-flow design utilizes 20 per cent greater eliminator area with resultant economy in draft loss and minimized drift.

The Marley Company

KANSAS CITY, MISSOURI

MARLEY

Spread the Bright Coat...

"Liquid Aluminum" is Here!

HIGH REFLECTIVTIY DECREASES EVAPORATION ...CUTS COSTS!

Use it From Rig to Retail!

What is *Liquid Aluminum?* Simply Reynolds Metals Company's descriptive new name for superior, high-grade aluminum paint. It is made by better paint manufacturers and packaged under the *Liquid Aluminum* foil label as your assurance of superior quality—with superior flexibility, light-reflectivity and economy because it covers better, lasts longer. Look for the paint in the shiny Aluminum foil label . . *Liquid Aluminum.*

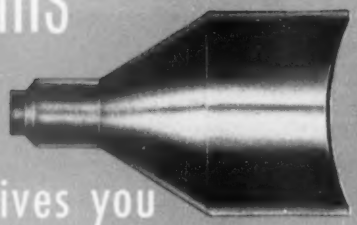
Liquid Aluminum resists rust . . . makes equipment last longer.

Heat-reflecting *Liquid Aluminum* decreases evaporation . . . guards against loss of volatile contents of tanks.

Sparkling *Liquid Aluminum* beautifies filling stations outside and inside . . . invites motorists.

This advertisement is run in the interest of the Paint Industry of America by
REYNOLDS METALS COMPANY, Louisville I, Kentucky

this



gives you
only this one thing

Deep Penetration

LANE WELLS
adds
these extras

- accurate depth measure
- service on-the-dot from 70 branches
- 20 years perforating experience
- thorough knowledge of local conditions
- safest possible operation

to make

KONE-SHOT

the "plus-value"
shaped-charge perforating!

The Service that gives you Everything!

Tomorrow's Tools-Today!

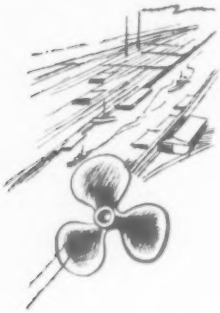
General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

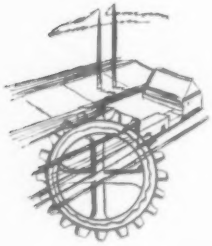
LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

AX-604

Oil

Avondale





3 facilities to serve you

. . . the main plant at Avondale (tugboat, towboat and barge building, tank cleaning, steel fabrication); the "Quick Repair Yard" on Harvey Canal (dry docking, propeller work, quick repairs); the Service Foundry Division (gear cutting and castings). All 3 facilities stand ready to serve the Oil Industry . . .

service integrity experience

An independent in South Texas replaced conventional mechanical equipment with the CARTER Unit. This was a depletion-type reservoir, making very little water, so that the conventional equipment could not be slowed down enough to keep from overpumping the well. The slow-motion VARIABLE-CYCLE operation of the CARTER Unit was the answer.

Major Oil Company in West Texas replaced old central-power equipment with the CARTER Unit. Well was extremely gassy. The slow-motion, VARIABLE-CYCLE effect was able to control this condition and improve production.

This astonishing increase was obtained by a major company in North Texas when they replaced conventional equipment with the CARTER Unit. Well made a large amount of gas. This was controlled by use of the slow-motion, VARIABLE-CYCLE operation obtainable only with the CARTER Unit.

CASE HISTORIES OF INCREASED PRODUCTION with

Carter

long-stroke Hydraulic Pumping Units

featuring — **the amazing Variable-cycle Principle**

Designed • Built • Priced for Stripper wells

In a surprising number of instances, replacement of conventional equipment with the CARTER Long Stroke Hydraulic Pumping Units has resulted in substantial production increases.

Why?

There are two principal reasons: accurate control of the pumping rate; and the VARIABLE-CYCLE Principle.

This means that any stripper well, regardless of how low its production rate, can be pumped continuously, on a 24-hour basis without pumping off or pounding fluid in a manner which very nearly approaches constant flow!

In addition to these features, CARTER Units are designed specifically for stripper wells, which means that the initial investment is low — in fact, on some installations savings up to 50% have been reported as against conventional equipment!

Write for Bulletin PR-253

S. C. CARTER COMPANY, inc.
1900 Santa Fe Avenue • Los Angeles, California

Sales and Service Representatives in —
Artesia — Borger — Bossier City — Casper — Dallas
Great Bend — Healdton — Irvine — Los Angeles — Odessa
Oil Springs — Owensboro — Pampa — Princeton — Salem
Robinson — Tulsa — Wichita Falls — Winfield
Export: Calgary — Edmonton — Caracas — Maracaibo
Puerto La Cruz — Port of Spain

IT TAKES *Money* FOR OIL PRODUCTION

. . . Yes, Exploration, Drilling, Producing, Refining and Pipe Line operations cost plenty. National Bank of Tulsa's oil department is familiar with oil finance needs and is always ready to discuss them with oil men. The resources, facilities, and "know-how" are your guarantee of prompt, efficient, adequate service.

See...

NATIONAL BANK OF TULSA
NBT

See Our Exhibit
OIL SHOW
TULSA MAY 14-23

The Oil Bank of America

NATIONAL BANK OF TULSA

OFFERING COMPLETE BANKING AND TRUST SERVICES

Member Federal Deposit Insurance Corporation

UNEXCELLED BAROID FIELD SERVICE has, for years, been based on engineering your drilling fluid — at your rig.

Baroid's engineer is your engineer. His training and experience in drilling fluid problems enable him to make valuable recommendations before the well is spudded in. Fully equipped with Baroid's perfected portable mud testing equipment, he can make "on the spot" mud tests and recommend the best materials and techniques for drilling fluid control.

The technical knowledge and skill of Baroid's dependable service and research team, supported by 25 years of field experience and energetic research, is quickly available night and day wherever wells are drilled throughout the United States and Canada.

Five hundred strategically located Baroid distribution points throughout the oil areas keep a complete line of drilling mud products only minutes from your rig.

These are the reasons why the word "Baroid" and the sight of the familiar blue service car are synonymous with the best in drilling mud products and services — for greater drilling safety — better mud control — lower drilling costs.

NOW AS EVER

you can rely on Baroid's

Unexcelled Service

: for faster, more efficient drilling!

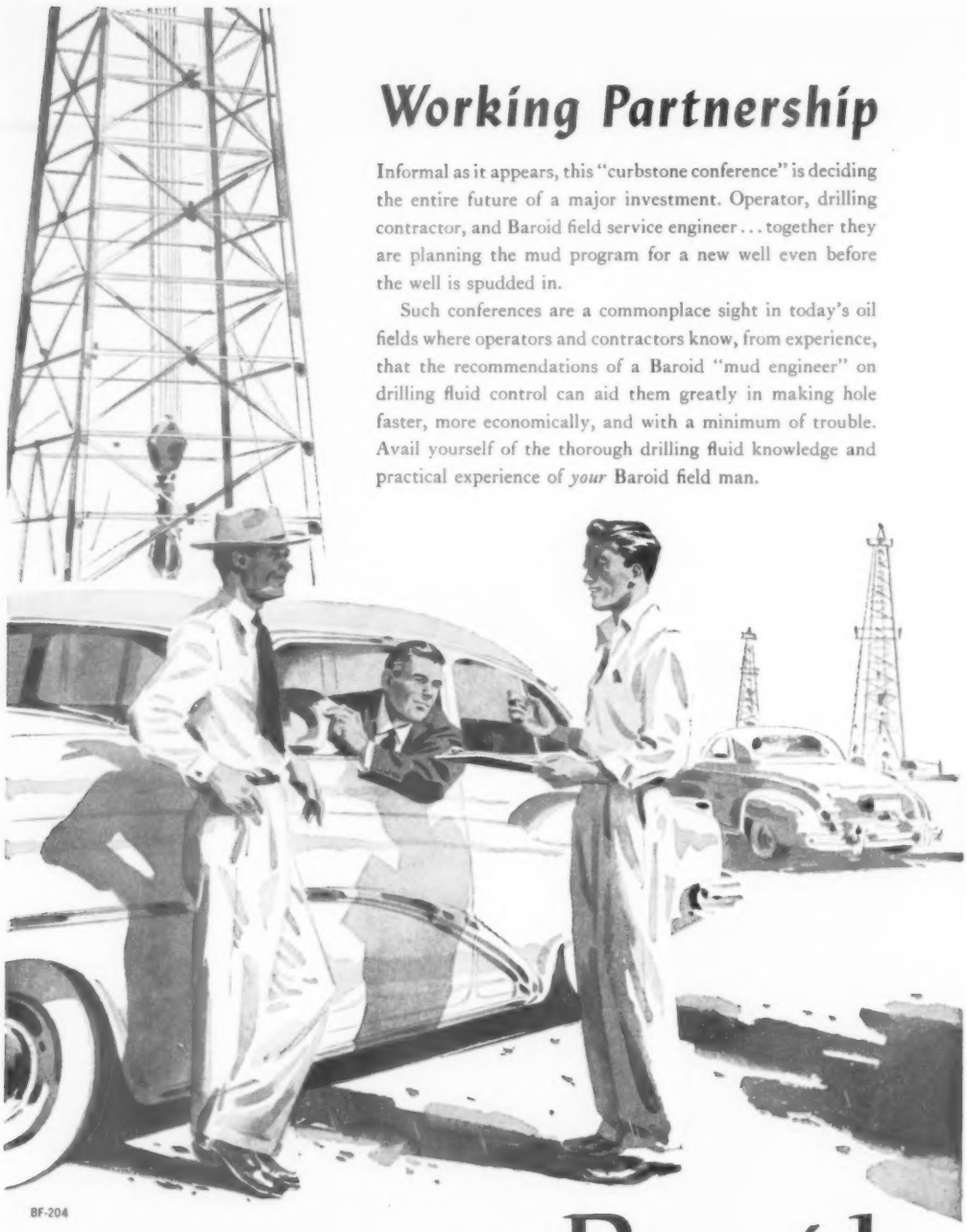
Baroid Sales Division — National Lead Company • Houston • Tulsa • Los Angeles ☆ Main Office: P. O. Box 1675, Houston 1, Texas

3959

Working Partnership

Informal as it appears, this "curbstone conference" is deciding the entire future of a major investment. Operator, drilling contractor, and Baroid field service engineer . . . together they are planning the mud program for a new well even before the well is spudded in.

Such conferences are a commonplace sight in today's oil fields where operators and contractors know, from experience, that the recommendations of a Baroid "mud engineer" on drilling fluid control can aid them greatly in making hole faster, more economically, and with a minimum of trouble. Avail yourself of the thorough drilling fluid knowledge and practical experience of *your* Baroid field man.



BF-204

you can rely on **Baroid**

HOUSTON · TULSA · LOS ANGELES

Baroid Sales Division • National Lead Company ☆ Main Office: Houston, Texas • P. O. Box 1675, Houston 1, Texas

Who Pioneered Oil Well Surveying?

23 Years Ago H. John Eastman pioneered Oil Well Surveying. Today, the company he founded has the finest equipment and service in the field for making sub-surface surveys.

Eastman offers you

RELIABLE SURVEY SERVICES

Accurate Surveys Are Essential to:

1. Directional Drilling
2. Correct Bottom Hole Spacing
3. **Assure Against Trespass**
4. Straight Hole Drilling
5. Planned Re-Drilling

BOOTH 44 SCIENTIFIC AND TECHNICAL BUILDING

Eastman equipment offers a complete range of specialized precision instruments to meet every requirement of this work.

Our offices are staffed with EXPERIENCED OIL WELL SURVEY SPECIALISTS. Call your nearest Eastman office for service.

EASTMAN OIL WELL SURVEY COMPANY

LONG BEACH DENVER HOUSTON

Export Sales and Service:
EASTMAN INTERNATIONAL COMPANY
P. O. Box 1500 Denver, Colorado

checkmate

Corrosion!

...WITH CATHODIC PROTECTION BY Harco

Make your move now! HARCO engineers can checkmate electrolytic corrosion in your underground piping. HARCO services are designed to meet every cathodic protection requirement.

HARCO JOB-ENGINEERED SYSTEMS provide all necessary testing, drawings, materials and installation as well as maintenance performed by experts. Complete integration of the entire job assures you of the most efficient and economical cathodic protection.

HARCO INSTALLATION CONTRACTING is completed to customer's specifications and covers as much or as little of the total job as required. HARCO is ready to assist you in the correct evaluation and solution of your particular corrosion problems.

MATERIAL AND SUPPLIES available from HARCO include the famous HARCO air-cooled and totally oil-immersed rectifiers, built to specific job needs . . . G-E rectifiers . . . graphite, treated-graphite and magnesium anodes . . . Polyken polyethylene tape . . . Cadwell Connections for cathodic protection systems . . . M. C. Miller meters and copper sulphate electrodes for testing . . . and other supplies necessary for cathodic installations.

Checkmate corrosion now! Specify HARCO . . . **first in the field of cathodic protection.**

1197-HC

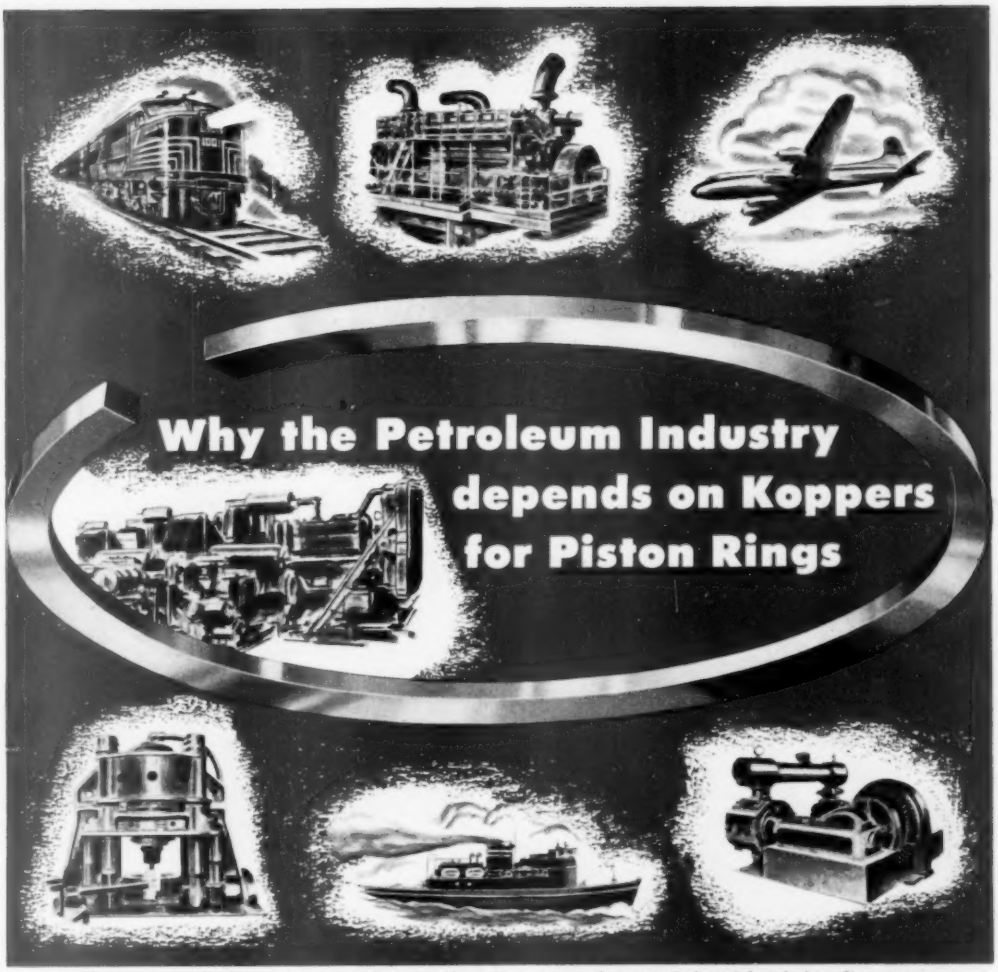
Write for catalog or call MOntrose 2-2080.

Harco

THE HARCO CORPORATION

16961 BROADWAY • CLEVELAND, OHIO

Cathodic Protection Division



Koppers manufactures piston rings in every size, of every type, for every industrial and aircraft purpose.

FROM all parts of the petroleum industry come reports of savings in time, labor and money through the use of Koppers Rings in pumps, compressors, diesel and gas engines and other equipment. That's because Koppers research and engineering keep up with modern advances in equipment design by constantly improving ring materials and manufacturing methods.

Koppers K-Iron® Rings are made of a high-grade, closely-controlled material that imparts improved wear properties and is surface treated chemically as an anti-scuffing aid. They are made in diameters to 120″ in a variety of joint types. Koppers Porous Chrome* Rings hold and distribute oil during break-in, quickly wear to best possible seating... *cut cylinder wear up to 50%, last 4 times as long as ordinary rings!*

Our engineers, who work with you in determining the best rings for your applications, have all the facilities of the large, modern Koppers piston ring plant at their disposal . . . to supply you with rings that cut down-time, increase efficiency and lengthen the life of your equipment.

WRITE, wire or phone us today for experienced help with your piston ring problems. KOPPERS COMPANY, INC., *Piston Ring Dept.*, 1650 Hamburg St., Baltimore 3, Md.

*Van der Horst Process

KOPPERS®

Koppers American Hammered Industrial Piston Rings

Only **KOPPERS** *can furnish K-Spun® and Porous Chrome!*

How's This for an OS&D

ENGINEERING DATA

TUBE: Nonporous, smooth bore tube drains clean, cuts frictional resistance and turbulence . . . patented bonding method "welds" tube to carcass—*tube cannot pull loose.*

CARCASS: Primary and secondary carcasses made of multiple plies of specially woven, high-tensile duck with high-tensile, round steel wire imbedded in the rubber . . . flexible enough to overcome stretch and stress.

COVER: Specially made with extremely tough synthetic compound to resist abrasion, sun-checking and the corrosive action of salt water.

FITTINGS: Nipples of steel or aluminum integrally built into the hose by patented Hewitt Durabond process . . . Nipples anchored to hose by rings welded on the nipples and layers of high-tensile steel wire in the wall structure of the hose. This seals against leakage . . . eliminates need for external clamps.

I.D.: 2", 3", 4", 6", 8", 10" & 12".

BENDING RADIUS: Minimum safe bending radius in service equals 1 foot to 1 inch of hose I.D.

WORKING PRESSURES: Up to 200 psi.

HEWITT-ROBINS INCORPORATED

HEWITT-ROBINS

DIVISIONS: HEWITT RUBBER • ROBINS CONVEYORS • ROBINS ENGINEERS

Hose Performance Record?

Customer's Performance Record

EQUIPMENT:

Hewitt-Robins Smooth Bore Oil Suction & Discharge Hose.

LOCATION:

Union Oil Company's Port San Luis Wharf, Avila, California.

OPERATION:

Loading crude oil into sea-going tankers.

LOADING CONDITIONS:

Loading conditions are so severe that tankers must be held some 75' to 100' away from the dock with the aid of 4 heavy mooring buoys plus the ship's anchor while loading in heavy seas. This is necessary because the dock faces directly on the ocean without harbor or breakwater protection and the dock itself extends approximately one-half mile from the shore line.

PERFORMANCE:

Due to the rugged service encountered, normal minimum life expectancy for loading hose at this installation is 15,000,000 barrels. To date, 37,000,000 barrels have been handled by a single line of Hewitt-Robins Smooth Bore OS&D Hose.

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED HEWITT-ROBINS HOSES FOR YOUR OPERATION, OR CALL YOUR HEWITT RUBBER DISTRIBUTOR

(See "RUBBER PRODUCTS" Classified phone book)

HOSE:

- ☐ Barge Loading
- ☐ Flexible Vibrator
- ☐ L P Gas
- ☐ Mud Pump Suction
- ☐ OS&D
- ☐ Rotary Drilling
- ☐ Servall® (All Purpose)
- ☐ Steam
- ☐ Tank Car
- ☐ Tank Truck
- ☐ Twin-Weld
- ☐ Water Suction
- ☐ Water Washdown
- ☐ PACKAGE BELTING
- ☐ MOLDED RUBBER PRODUCTS

Hewitt-Robins Incorporated
666 Glenbrook Road
Stamford, Connecticut

NAME _____

TITLE & COMPANY _____

STREET ADDRESS _____

CITY _____ ZO ZONE _____ STATE _____

289

INCORPORATED

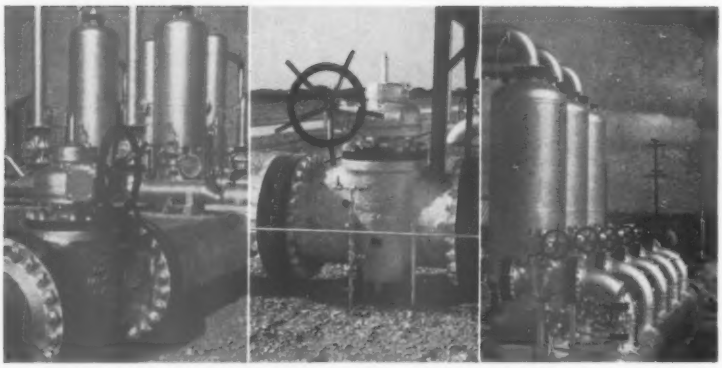
RESTFOAM® • EXECUTIVE OFFICES: STAMFORD, CONNECTICUT

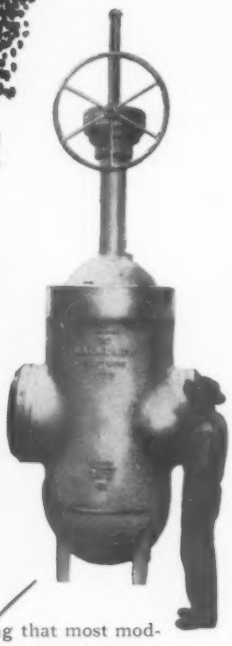
WALWORTH

has made bronze, iron, and steel

VALVES

for over 110 years!





No item used for pipe lines, refineries, natural gasoline plants, petrochemical plants, or other oil country construction or maintenance is more universally respected than Walworth Valves. When you say STOP with a Walworth, you speak with the authority of the oldest valve manufacturer in America.

Your J&L supply store is Walworth headquarters locally. Ask for any size, any quantity, for any purpose . . .

. . . including that most modern of all steel pipe line gate valves — the new Walworth Type 49 in sizes from 2 to 30 inches.

PESA

JONES & LAUGHLIN STEEL CORPORATION
SUPPLY DIVISION

J&L STEEL

General Offices: **TULSA, OKLAHOMA**

88 STORES • 19 OFFICES • 9 RESIDENT SALESMEN

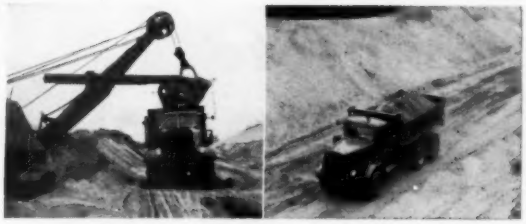
EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.

AUTOCARS GIVE YOU BETTER PERFORMANCE UNDER TOUGH CONDITIONS

You'll get constant, dependable service from your Autocars—no matter how much you ask of them. They're built with a margin of strength and stamina which comes in mighty useful when you move mountains of material over all types of terrain. For dependable, low-cost hauling, rely on heavy-duty Autocars designed for your individual operation.

AUTOCAR TRUCKS

The Autocar Company, Ardmore, Pa.
Established 1897
Factory Branches and Distributors from Coast to Coast



CLIP AND MAIL

The Autocar Company, Ardmore, Pa.

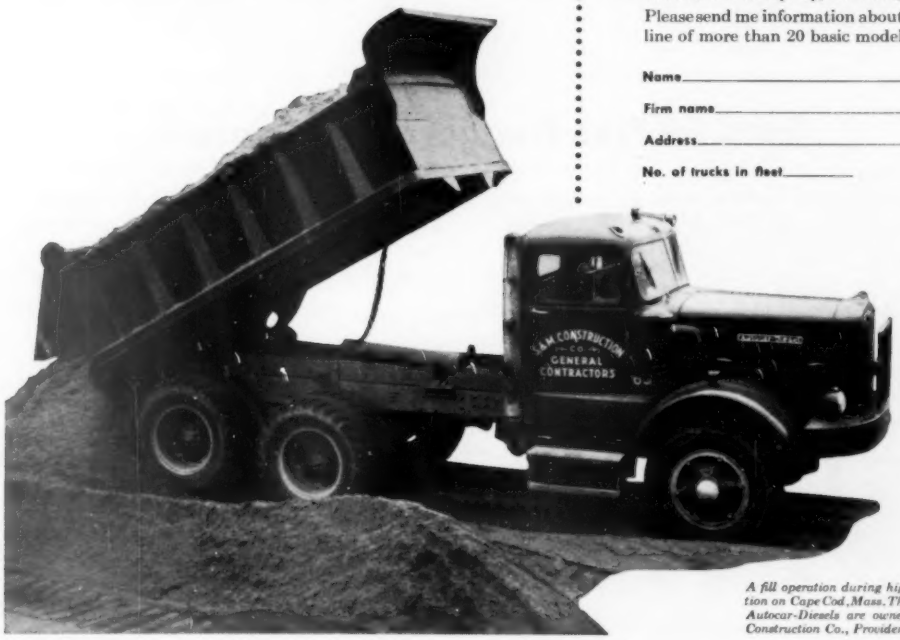
Please send me information about the Autocar line of more than 20 basic models.

Name_____

Firm name_____

Address_____

No. of trucks in fleet_____ 19D



A fill operation during highway construction on Cape Cod, Mass. The husky 6-wheel Autocar-Diesels are owned by S. & M. Construction Co., Providence, R.I.

ALLIS-CHALMERS

PROCESS PUMPS

Allis-Chalmers Type APKK explosion-proof motor. Fin-type design with no enclosed passages for external cooling air. Cannot clog and overheat. If cleaning is required, it takes only a few minutes with cloth, brush, vacuum or air hose. All cast-iron frame resists corrosion. Similar design available in totally-enclosed, fan-cooled motors for non-hazardous locations.

Allis-Chalmers oil-lubricated, frame-type pump. Will handle many process jobs at less cost than usual refinery pump. Available with capacities to 1200 gpm, heads to 250 feet and temperature range to 550 F. Built with wide choice of materials to handle many types of corrosive liquids. Can be provided with six different sealing arrangements, including mechanical seal and water-cooled stuffing box. As you can see from the picture, there is plenty of room between the pump and the bearing for maintenance.

Here's Why An Allis-Chalmers Complete Pumping Unit Is Your Best

Send for Free Engineering Literature

Motors

- ☐ Handy Guide to Motor Selection — 51B6052
- ☐ Explosion-proof Motors (APZZ) — 51B7286
- ☐ Explosion-proof Motors (AZZ) — 51B7149

Pumps

- ☐ Handy Guide to Pump Selection — 52B6059
- ☐ Oil-Lubricated, Frame-type Pumps — 52B7638

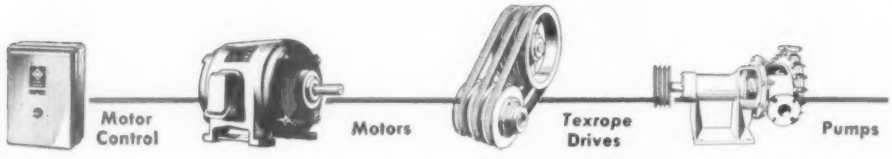
Control

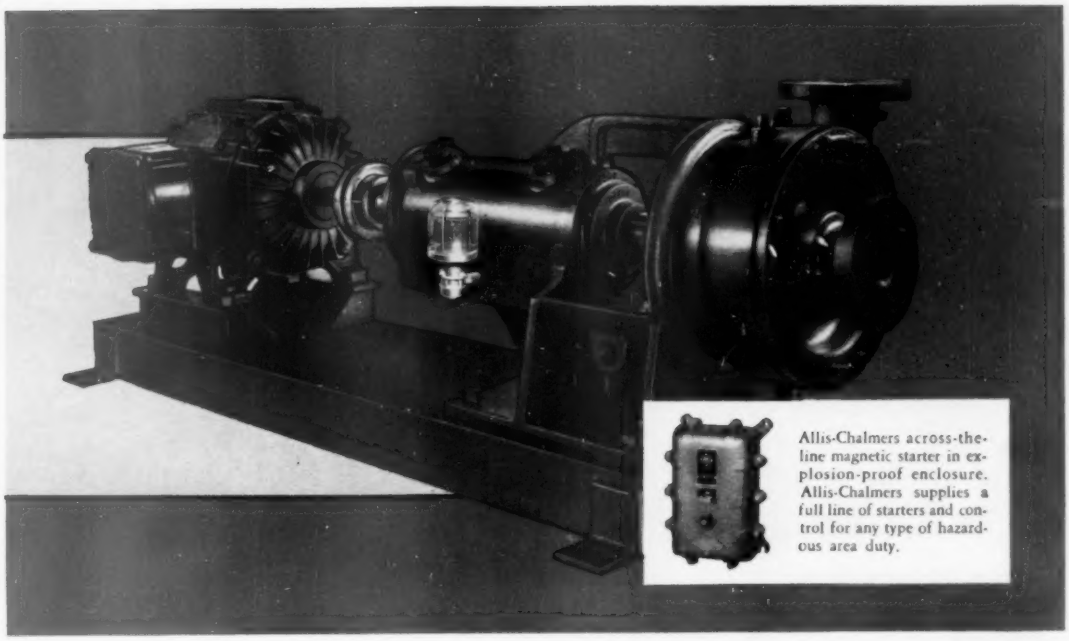
- ☐ Handy Guide to Starters — 14B7733
- ☐ Reduced Voltage Starters — 14B7215

Texrope Drives

- ☐ Handy Guide to *Texrope* Drives — 20B6051

COMPLETE SERVICE *from power line to machine*





Allis-Chalmers across-the-line magnetic starter in explosion-proof enclosure. Allis-Chalmers supplies a full line of starters and control for any type of hazardous area duty.

Pump Buy

Pump, Motor and Control are designed, built, assembled and tested by Allis-Chalmers. With this ready-to-run unit you save engineering time . . . installation costs . . . service problems.

YOU CAN SAVE the time and expense of engineering a pumping unit from several manufacturers' catalogs. Allis-Chalmers will supply the complete pumping unit, with all parts of coordinated design and manufacture, ready to install and run. This engineering service costs you nothing extra.

No Service Problems

The complete unit is guaranteed by one reliable manufacturer, Allis-Chalmers. No buck passing on performance responsibility. Nearly a hundred Allis-Chalmers Certified Service Shops provide factory-approved service in every large industrial area.

Get Complete Information

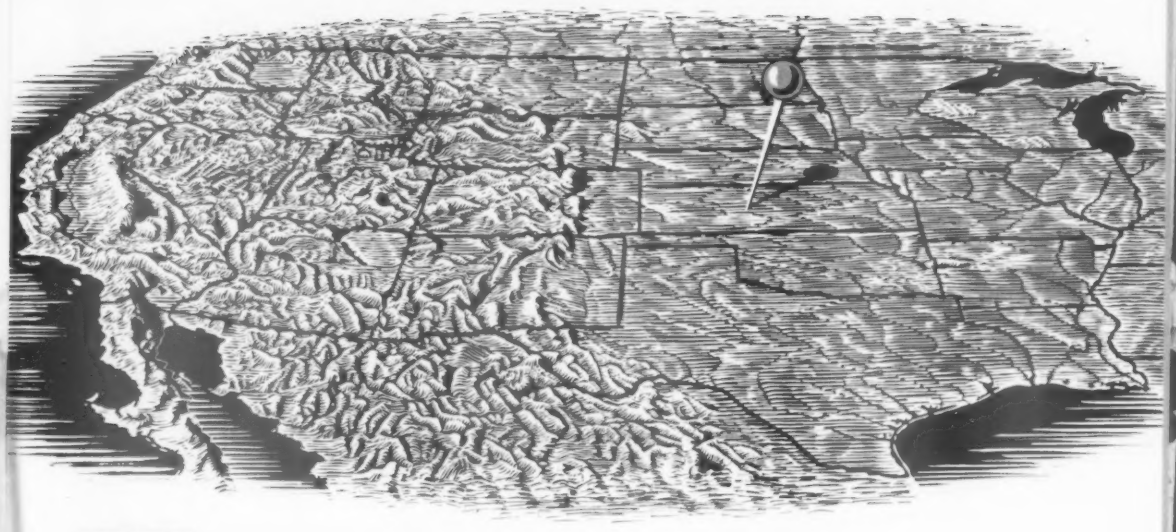
Get help on your pumping problems by calling an experienced Allis-Chalmers pump application engineer at your nearby Allis-Chalmers District Office.

A-3974

Texrope is an Allis-Chalmers trademark.

ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN



What's so different about Great Bend, Kansas?

That single pin is symbolic of specific problems facing a core analyst in the Great Bend area. Actually the pin could have been spotted at Calgary, or Abilene, or Tyler, or Lafayette — or at any one of Core Lab's twenty-nine field offices. The point is — wherever drilling is in progress the "pay-off" characteristics of oil, gas, and water-bearing formations vary from area to area, basin to basin, county to county, and in large fields, even from well to well.

True, each of our permanent and portable units is equipped with standard core analysis equipment. True, every man who analyzes core for Core Lab follows modern laboratory procedures. Certainly we use Core Lab-developed sets of "average" data for specific areas. So do our contemporaries.

Then what is it that makes Core Lab's core analyses more reliable, more comprehensive? It is *seventeen years of Experience* which we are privileged to draw upon — *Experience* that, under certain conditions, may even defy routine mechanically-procured information.

It is seventeen years of core analysis work, associated with the discovery and production of more than 700 fields, which affords Core Lab the ability to anticipate, to recognize, and to interpret accurately every existing aspect of reservoir behavior.

When your exploratory effort reaches the "pay-off" stage it deserves more than routine core analysis. It deserves an infinite blending of laboratory procedure with the logic of past *Experience*. It deserves the best.

CORE LABORATORIES, INC. ● **IN ALL ACTIVE AREAS**

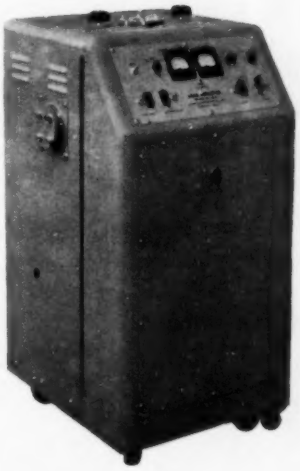
Dallas, Houston, Corpus Christi, Midland, Abilene, San Antonio, Tyler, Wichita Falls, Lubbock, Oklahoma City, Ft. Worth, Great Bend, Shreveport, Lafayette, New Orleans, Natchez, Bakersfield, Denver, Sterling, Worland, Williston, Billings, El Dorado, Farmington, Lovington, Calgary, Edmonton, Venezuela, S. A.

CORE LAB

PETROLEUM RESERVOIR ENGINEERING

Where there can be no leakage

this instrument eliminates guesswork



IF YOU have a highly critical process such as manufacturing hermetically sealed instruments or sealing components in evacuated glass tubes you can tolerate no leakage. For detecting incredibly small leaks in such low-volume, low-pressure applications, there is only one instrument sensitive enough to do the job—Consolidated's mass-spectrometer-type Leak Detector. For less critical work, involving the use of hi-vacuum equipment, high-pressure cylinders, containers having welded or soldered joints, or valves moving on an assembly line, this versatile leak detector is the perfect instrument, guarding the effectiveness of your process and guaranteeing the quality of your product.

Consolidated Engineering CORPORATION

300 North Sierra Madre Villa, Pasadena 15, California

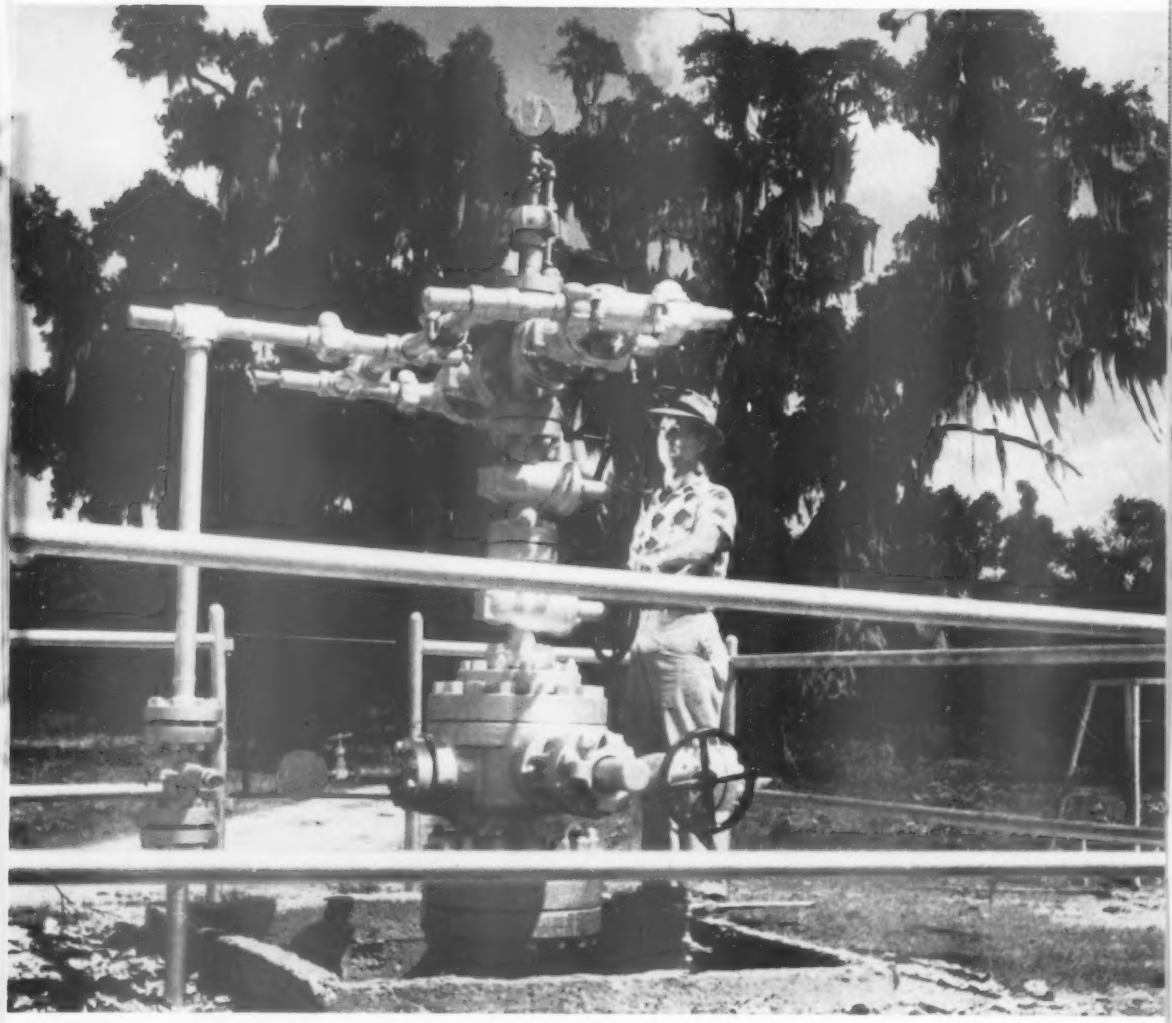
Sales and Service through **CEC INSTRUMENTS, INC.,** *a subsidiary with offices in: Pasadena, Philadelphia, New York, Chicago, Dallas*

analytical instruments for science and industry

Leak Detector *Consolidated's Model 24-101A* detects, locates, and measures leaks in the micron range where it would take 31 years for one cubic centimeter of gas to escape. Request CEC Bulletin 1801-X2.

National Wellhead

...a versatile line,



NATIONAL BLUE PRODUCTS

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

Equipment
dependable in performance

Designed for virtually any completion method at any depth or working pressure, National Wellhead Equipment is available in a wide, versatile range of sizes and types. Each tree in the line of National Wellhead Equipment is built to give you the utmost in dependable, efficient performance. You can rely on it, for National Wellhead Equipment is:

Designed for Maximum Flexibility—interchangeable units afford a multitude of combinations to meet specific requirements in size, capacity and type

Thoroughly Tested—intensive testing procedures include conventional methods and special methods simulating conditions more severe than those likely to be met in actual service

Safe—triple-sealed Pressure Pack design insures trouble-free performance

Easy to Assemble—parts are self-locating and self-activating, no special tools needed for installation

National Wellhead Equipment is engineered, manufactured and completely tested at National Supply's Houston, Texas, Plant where every facility is devoted to building these dependable trees. And you'll find them readily available in the stocks at National Supply Stores throughout the United States and Canada—where you'll also find a National Wellhead Equipment specialist ready for consultation on your wellhead problems.

A new booklet featuring National Type "B" Pressure Pack Wellhead Equipment will soon be off the presses. Write for your copy.

THE NATIONAL SUPPLY COMPANY

PITTSBURGH 30, PENNSYLVANIA

DIVISION OFFICES: Denver; Ft. Worth; Houston; Pittsburgh; Tulsa; Torrance
CANADA: The National Supply Company, Ltd., 200 F. W. Clark Building, 709 Eighth Avenue, West, Calgary, Alberta
EXPORT: 600 Fifth Avenue, New York 20 N.Y., U.S.A.; River Plate House, 12 South Place, London E.C. 2

Chemicals you live by

"BET-A-MILLION" GATES WAS A PIKER!

Remember the spectacular gambler, Gates, who bet one million dollars? A piker!

The oil industry tosses millions away every year—gambling with corrosion. But the odds can be turned in favor of considerable savings by proper use of DIAMOND chromate and sodium bichromate to reduce corrosion. The life of drill strings may be increased 4 to 7 times with the use of these chemicals. Our customers in the oil industry who regularly use these preventative chemicals have proved they save money. Let the DIAMOND representative give you the facts.

Other DIAMOND chemicals that save money for oilmen are carbon tetrachloride, bicarbonate of soda, caustic soda, chlorinated paraffins, chlorine, silicate of soda, and several specialties. If you don't know how these chemicals save money—don't you think it might be worth your while to investigate? Call DIAMOND.

DIAMOND ALKALI COMPANY
CLEVELAND 14, OHIO

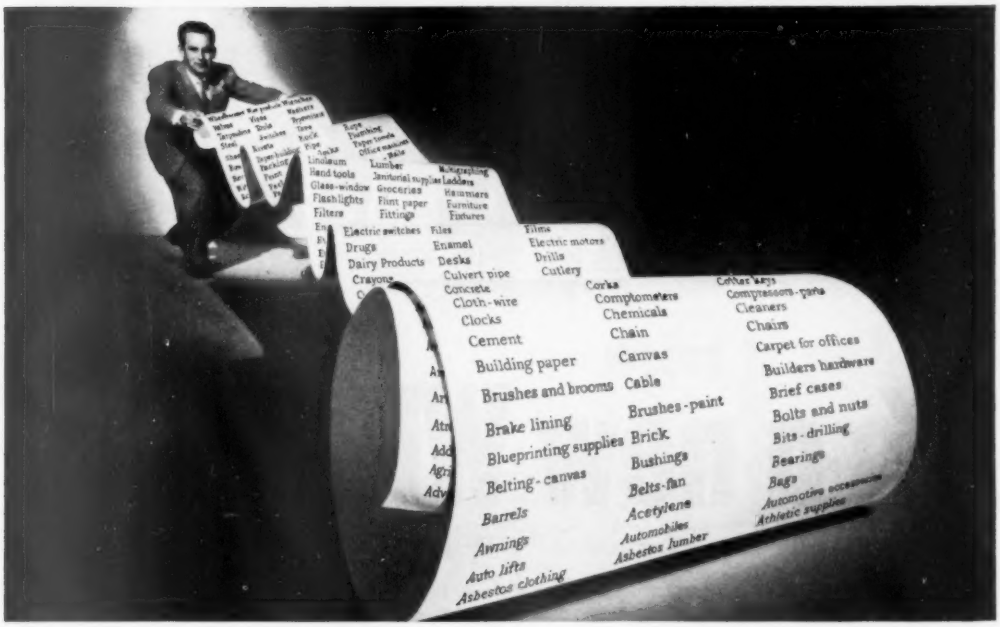
DIAMOND SALES OFFICES:

New York,
Philadelphia,
Pittsburgh,
Cleveland,
Chicago,
Cincinnati,
St. Louis,
Memphis,
Houston.

Diamond Chemicals for the Oil Industry

DIAMOND ALKALI CHEMICALS ®

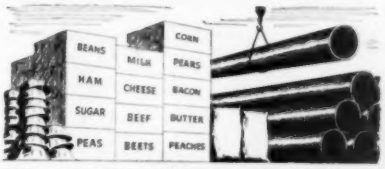
Short story of a long shopping list



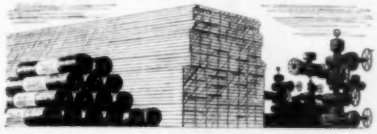
If you were to jot down all the different kinds of goods and services Standard Oil Company of California buys, your shopping list would be about 50,000 items long. Over the years, we've been growing as a *customer* as well as a supplier here in the West.

But the most important aspect of our "shopping," we believe, is *where* we do it. You might think that a large company like Standard would centralize its buying in a few big cities. Actually, our purchases are made in hundreds of Western communities. The almost infinite variety of Standard's needs—from paper clips to propellers, from produce to professional services—has made the Company an important factor in the economic well-being of Western towns and cities.

Last year, once again, Standard was a very good customer for a great many firms—more than 10,000 suppliers, both large and small, to whom we paid more than $125,000,000. We've always bought locally wherever possible and practical. We do it not only because it's good business for Standard, but also because it helps the growth of the West. We know that our long-run prosperity depends on that of the communities we serve.



From groceries to drilling pipe, Standard's purchases in local communities mean business to merchants all through the West.



We buy building materials—lumber, roofing, plumbing, carpentry, and supplies for our oil fields, refineries, plants, and offices.

We also use the services of doctors, nurses, pharmacists, lawyers, engineers, surveyors, drilling contractors, geophysicists and many others.

STANDARD OIL COMPANY OF CALIFORNIA ***plans ahead to serve you better***

IT'S HOT

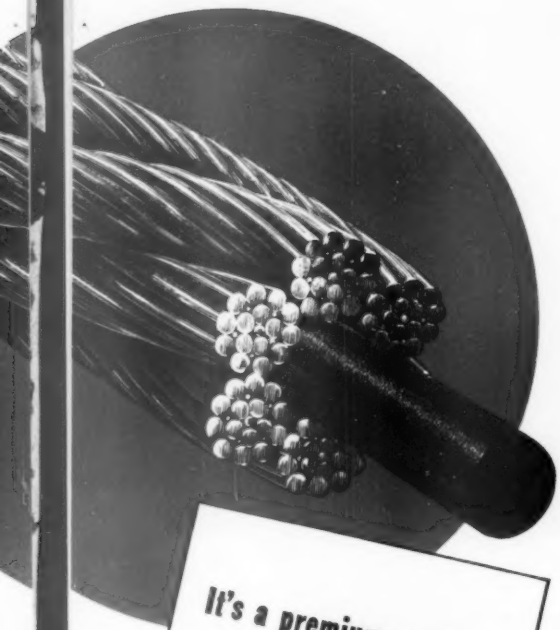
...it's a new WIRE ROPE

NEWS!

Here's what J&L's

NEW PLASTIC-CORE

means to you!



It's a premium product— at NO EXTRA COST!

1. Resists acid and other corrosive conditions.
2. Does not absorb or retain moisture.
3. Permanent support for strands.
4. More uniform diameter.
5. Protects against internal corrosion.
6. Retains flexibility.

J&L PLASTIC-CORE IS TESTED AND PROVED

. . . in actual jobs under a wide variety of acid and corrosive conditions. The advantages of this new product have been proved. J&L representatives are ready to give you complete factual information.

CALL YOUR NEAREST J&L DISTRIBUTOR

. . . he's ready to give you complete information and show you samples . . . give you efficient service.

JONES & LAUGHLIN STEEL CORPORATION
Wire Rope Division
PITTSBURGH

IF YOU NEED ADDITIONAL HELP IN OBTAINING PLASTIC-CORE MAIL THIS COUPON TODAY!

J&L STEEL

Jones & Laughlin Steel Corporation
Wire Rope Division
Pittsburgh 30, Pa.

I'd like complete information on your new PLASTIC-CORE Wire Rope.

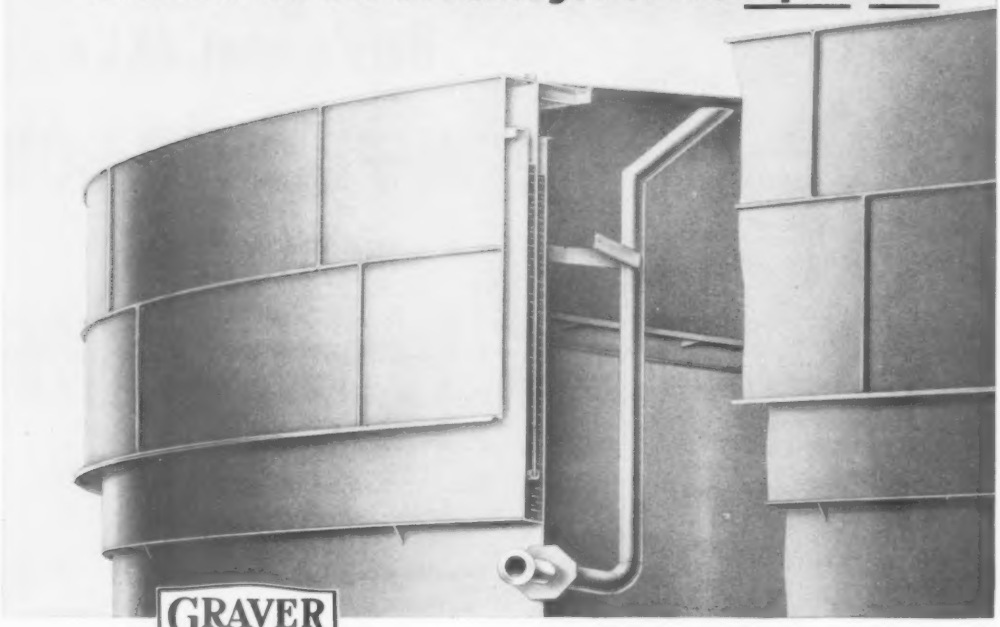
Name_____

Company_____

Address_____

ONLY THE GRAVER EXPANSION ROOF

...offers all the advantages of the liquid seal



Positive seal protects under all conditions
High operational efficiency shown over a decade

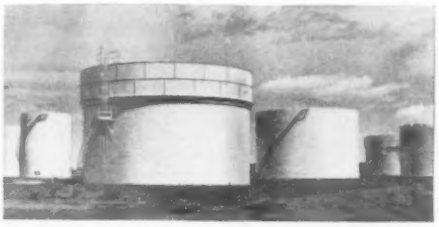
... Low maintenance equals that of cone roof tankage
Easy manifolding affords terminal-wide protection

... Accurate gauging obtained through vertical lift
Unique stabilizing device means trouble-free action

... Removable weather hood facilitates inspection
Simple installation converts existing tankage
Underwriters' Laboratories asserts Graver Expansion Roof conducive to reduction of fire hazards

TULSA MAY 14-21

Available upon request is a 16-page booklet describing in full the operation of this exclusive Graver design. Graver Expansion Roof tanks have been protecting volatile elements of gasoline at important installations since 1939.



GRAVER TANK & MFG. CO., INC.
EAST CHICAGO, INDIANA
NEW YORK • CHICAGO • PHILADELPHIA • ATLANTA
DETROIT • CLEVELAND • HOUSTON • PITTSBURGH
CATASAUQUA, PA. • SAND SPRINGS, OKLA. • CASPER, WYO.

Corrosion increases your... ...lifting costs

Typical example of sucker rod failure due to corrosion. This rod was pulled from a well in the Toborg Field near Iraan, Texas.

NOCOR
CORROSION INHIBITOR

Would you spend a nickel to save a dollar? New Nocor "102" has proven as much as 98.8% effective against even the most highly corrosive wells. The small cost of Nocor "102" saves the waste of expensive workover jobs time and time again. Some wells, formerly shut down at least once a week for pulling jobs brought about by corrosion have — since Nocor treatment began — operated continuously without shutdown.

Get the inhibitor of proven effectiveness, Nocor "102" — another product of Cardinal's unending research to make good things even better.

Price $1.50 per gallon f.o.b. Odessa, Texas

Write for representative nearest you...

CARDINAL CHEMICAL · INC.

HOME OFFICE ● ODESSA, TEXAS ● BOX 2049

FOR UNITIZED PUMPING EQUIPMENT

Made in Two Sizes:
1⅛"-1¼" Polished Rods
1½" Polished Rods

It's The RATIGAN "204" POLISHED ROD GRIP

SHORT • NARROW
COMPACT • LIGHTER

With 30% Greater Holding Capacity

Here's a tough and rugged polished rod grip designed to serve with modern unitized pumping equipment. About half as wide as former grips, shorter, and weighing only 19 pounds, the "204" provides a bonus of 30% greater holding capacity. It will accommodate all carrier bars supplied by the manufacturer of pumping units.

Despite its greater efficiency and safety, this improved polished rod grip actually costs less than former types. From every standpoint, you're money ahead with the "204".

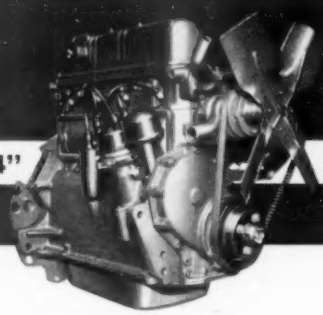
It Will Pay You To Get The Facts On The Complete Line of RATIGAN Pumping Equipment. Backed By Years of Outstanding Experience In Serving The Oil Industry. Write, Wire or Phone for The Latest Edition Of The Ratigan Catalog. Available Now!

J. P. RATIGAN, INC.
1213 Santa Fe Avenue, Los Angeles 21, Calif.
Export: National Supply Company, Inc., Export Division
600 5th Avenue, New York 20, N. Y.

RATIGAN PRODUCTS ARE SOLD BY LEADING SUPPLY STORES

FORD'S *Heavy Duty* INDUSTRIAL ENGINES

meet America's most popular power needs!



FORD "134" 4-CYL., O.H.V.

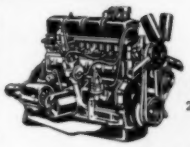
Ford's Overhead Valve Industrial Engines have been thoroughly tested and highly accepted for industrial applications in the field, and now a 4-cylinder power plant of the same type is being offered. This Ford "134" cu. inch engine incorporates notable advancements for still greater performance and operating economy. **Bore:** 3.4375 in. **Stroke:** 3.6 in. **Rating** (dyn.): 45 b.h.p. @ 2400 rpm.

Manufacturers of powered equipment throughout the U.S.A. are constantly in search of economical power to speed productive activities and increase profits.

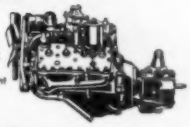
Because of its efficient mass production methods and nationwide service facilities, the Ford Motor Company is a popular source of economical, low-cost Industrial Power. *Here* on this page are the engines which Ford has designed and built to its famous Hi-Precision standards *especially* for the needs of Industry.

You'll find these Heavy Duty Engines at work today powering equipment in our vast oil fields, on our farms and in factories, around logging camps, sawmills, road building and huge construction projects.

If you're interested in any of the engine series shown, one of Ford's Staff of Sales Engineers will be glad to discuss your power problem and perhaps help you solve it advantageously.



FORD "215" 6 cyl.
Industrial Engine
215 cu. in. displacement



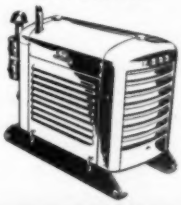
FORD "239" V-8
Industrial Engine
239 cu. in. displacement

FORD "254" 6 cyl.
Industrial Engine
254 cu. in. displacement

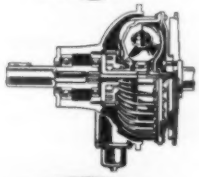
FORD "279" V-8
Industrial Engine
279 cu. in. displacement

FORD "317" V-8
Industrial Engine
317 cu. in. displacement

TYPICAL FORD CLOSED TYPE POWER UNIT



FORD
MULTA-TORQUE
CONVERTER



Ford
INDUSTRIAL ENGINES
AND POWER UNITS

YOUR JOB IS WELL POWERED WHEN IT'S FORD POWERED

CLIP AND MAIL THIS HANDY COUPON TODAY!

INDUSTRIAL ENGINE DEPARTMENT
FORD MOTOR COMPANY, 15050 Woodward Ave., Highland Park 3, Michigan

WE ARE INTERESTED IN INDUSTRIAL POWER FOR:

_____
(state your application)

Please send us latest literature on Ford Industrial Engines checked below:

☐ "134" 4-Cyl. ☐ "215" 6-Cyl. ☐ "239" V-8 ☐ "254" 6-Cyl.
☐ "279" V-8 ☐ "317" V-8 ☐ "MULTA-TORQUE" Converter

FIRM NAME _____ YOUR NAME _____
(Please Print)

STREET ADDRESS _____

CITY _____ ZONE _____ STATE _____

From Alberta to Saudi Arabia

SPARTAN TRAILERS

ARE HELPING OIL PEOPLE FEEL *At Home*

The Royal Spartanette, truly Fit for a King

Spartan Trailers are Known the World over for their livability and quality. Designed for a lifetime of service for you. The most modern Home-on-Wheels you can imagine—completely furnished and equipped—ready for you to move in and enjoy living wherever you may roam. . . . **The all-riveted construction assures you trouble-free operation and the aircraft type structure guarantees you long life for your Spartan. . .** Look to Spartan for Mobile Housing . . . Also, Custom-made trailers can be made right in our own plant for your any need to house Men, Machinery, or Material.

Write or Call us Today. . . .

ALL METAL, ALL RIVETED *Construction*

WRITE FOR LITERATURE

Spartan Aircraft Company
1921 North Sheridan Road
Tulsa, Oklahoma

Name.....

Address.....

City.....

State.....

SPARTAN AIRCRAFT COMPANY

1921 North Sheridan Road

TULSA, OKLAHOMA

Let this pump help you

Put Corrosive Wells On a Paying Basis

With pumping equipment that fits your exact needs, even severely corrosive wells can be produced — *profitably.*

As an example of how important the right equipment is, consider the experience of an operator who was pumping 90 gallons a minute from a depth of 2,400 feet.

This was a satisfactory rate—as long as the pump worked properly. But it seldom did, for its efficiency was continually hampered by corrosion of pump shaft and diffusers.

The picture changed completely after the *Reda Pump Company*, of Bartlesville, Okla., stepped in. They equipped the pump with a "K"® Monel shaft and Ni-Resist® diffusers. And here, in terms of performance, is what this means:

A "K" Monel shaft, first of all, resists the corrosive action of gas and crudes containing hydrogen sulfide and brine. It has the extra strength needed to withstand heavy vibration, constant stress and sudden torque. Moreover, it resists wear, and the abrasive impact of entrained solids.

As for Ni-Resist diffusers, they not only minimize the effects of corrosion, but provide a more durable surface for rapidly turning impellers. A cable shielded with Monel® tape and securely held by Monel bands adds the final protective touch.

No wonder trouble in the well ended with installation of this pump!

Other operating troubles, too, are often eliminated when Inco Nickel Alloys go to work. These metals have proved their value for use under difficult conditions. They've provided years of service for operators in highly corrosive areas. Keep them in mind, for there's a good chance they can solve one of your equipment problems.

Remember, though, that Inco Nickel Alloys are much-wanted metals. It pays to anticipate your needs as far in advance as you can, and then to place your orders with equipment manufacturers at once. *The International Nickel Company, Inc.*, 67 Wall Street, New York 5, N. Y.

Inco Nickel Alloys

INCO Monel & "K" Monel

... YOUR PARTNERS IN PROGRESS

THE REDA PUMP has no gears, valves or reciprocating parts. The entire producing unit (including motor) is small enough to be run easily in wells cased with small diameter pipe. Capacities range from 20 to 13,000 barrels per day, with lifts up to 13,000 feet. For more information, write directly to the Reda Pump Company, Bartlesville, Okla., through whose courtesy the illustrations and operating data on this page were supplied.

"Okay, Joe," I said, "Can you do better?"

"You know the way you get when troubles pile up. Packer leaking on one job, stuck packer in another, well...I was sore. So when Joe came in (Joe's the Lane-Wells man) and said something, I let him have it. "Can you do better?" I asked him...and he came right back.

"Sure I can," he says. "First, because my packers -- Lane-Wells packers -- are engineered to do their jobs by oil country men, guys who really know what it takes. And second, because we've got enough honest-to-gosh field-tested information to let us suggest the right packer for the job. Now, let's see what you're up against!"

"So we worked over the situation together. His recommendations added up; his packers did the job. Matter of fact, they're still doing it -- them and the other Lane-Wells packers I've gotten since. All I can say is --

"He sure did...these are the best darn packers I've ever used"

Engineered PACKER Service

Tomorrow's tools today!

LANE WELLS COMPANY

AP-603

General Offices, Export Office, Plant - 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

RCA MICROWAVE

Over the years RCA MICROWAVE has proved it stays in service when you need communication most.

Most practical system, most complete service

To get the most from your microwave investment, check the record for downright dependability—and you'll specify RCA MICROWAVE.

For example, check the operating records of RCA MICROWAVE systems over the years. Check RCA's long history of successful operation through every kind of weather. Or check the numerous RCA installations that are now providing continuity of service in many applications. RCA can offer you a long working record of dependability.

For complete Service, check RCA's survey, construction, and installation facilities. They're complete single-source, single-responsibility service.

For more speed, for improved operation, check RCA Communication Equipment for your business. Contact your local RCA Regional Office for information, or *mail coupon now.*

Check RCA 2-way radio for downright dependability in mobile communications.

And remember, only RCA can provide the nationwide service facilities of the RCA Service Company.

RADIO CORPORATION of AMERICA

COMMUNICATIONS DIVISION **CAMDEN, N. J.**

Radio Corporation of America
Communications Division
Dept. 89PC, Building 15-1
Camden, N. J.

Please send me your new, free booklet on:

- ☐ RCA Microwave
- ☐ RCA 2-Way Radio

Name_____

Title_____ Company_____

Address_____

City_____ Zone_____ State_____

PROTECT YOUR PRODUCTION

WITH

HARPER

corrosion-resistant fastenings

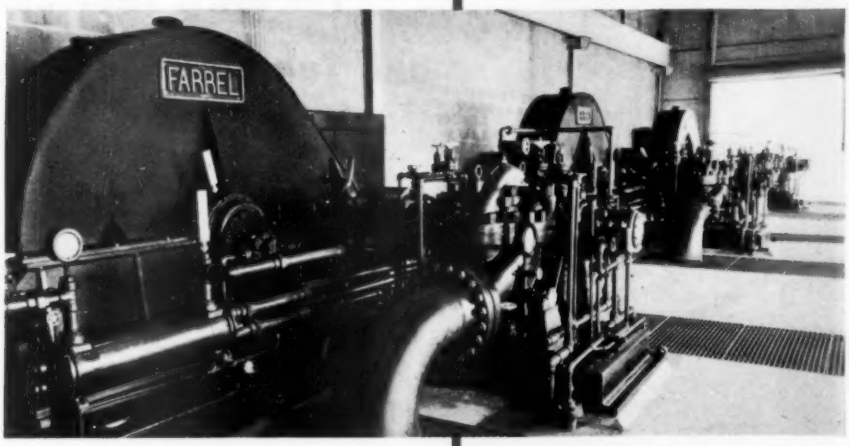
At the refinery or in the field, the bolts, nuts and screws upon which the satisfactory performance of all equipment depends are constantly subject to that arch enemy of metal—corrosion.

Harper Fastenings resist corrosion—corrosion caused by natural weathering—by salt spray—by sour crudes—by caustic solutions. Today, Harper is the largest exclusive producer of fastenings of such corrosion-resistant metals as brass, silicon bronze, naval bronze, Monel, nickel, copper and all stainless steels—over 7,000 different items carried in stock.

Harper metallurgists are ready to assist you in solving any tough corrosion problem you may be facing. Harper engineers will gladly work with you on the development of special fastenings to assure simplified manufacture or improved equipment. For information on fastenings, see your Harper Branch or Distributor.

THE H. M. HARPER COMPANY
8208 Lehigh Avenue, Morton Grove, Illinois

3 FARREL® speed increasers serve Venezuela's Big-inch Pipe Line



Venezuela's new 30", 165-mile, crude-oil line has a single pumping station, located at Palmarejo de Mara. There, three Farrel speed increasers are each transmitting 1,850 HP from a Cooper-Bessemer Gas-Diesel engine to a Byron Jackson pump, stepping-up the speed from 314 to 2500 RPM. Provision has been made for conversion of the Cooper-Bessemer engines to turbo-charged operation, with an increased rating of 2500 HP each. The Farrel units are designed to transmit 2550 HP.

Because of their unique operating record, Farrel speed increasers are a particularly good choice for this installation. Hundreds and hundreds of these units—totalling more than a quarter of a million horsepower—have been installed in pipeline pumping stations, and every unit placed in service since 1932, when the line was first developed, is still operating successfully.

This amazing record is worth remembering the next time you are in the market for speed increasers. It provides a virtual guarantee of trouble-free operation.

The new line (see map below) transports a lightweight grade of crude oil from Palmarejo de Mara to Cardon and Las Piedras on the Paraguana Peninsula. Operated by Shell Caribbean Petroleum Company, it has a rated capacity of 235,000 barrels per day.

•

For further details of these proved-on-the job speed increasers, send for a copy of bulletin 448A. No cost or obligation.

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONNECTICUT

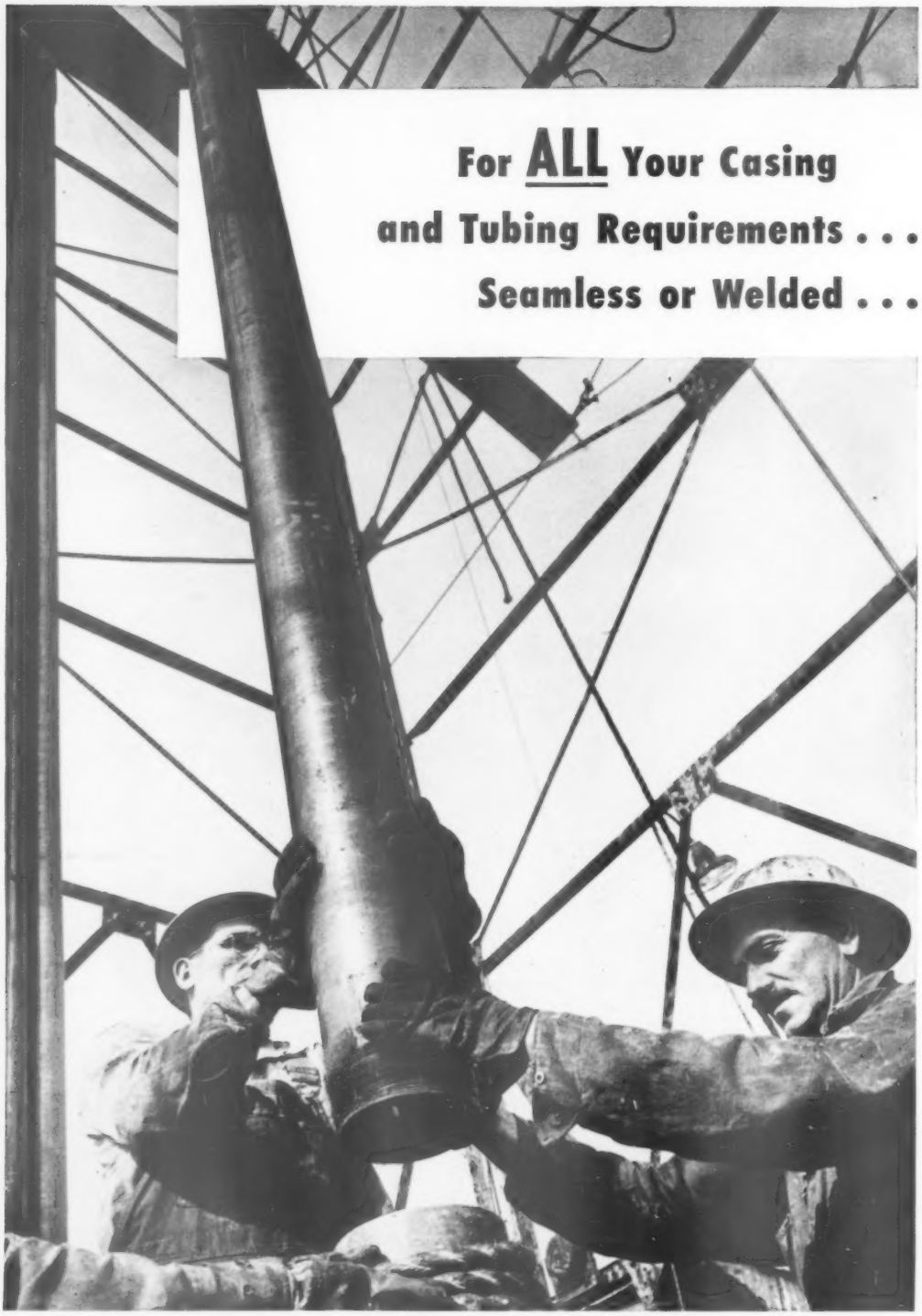
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh Akron, Detroit, Chicago, Memphis, Minneapolis, Portland (Oregon), Los Angeles, Salt Lake City, New Orleans

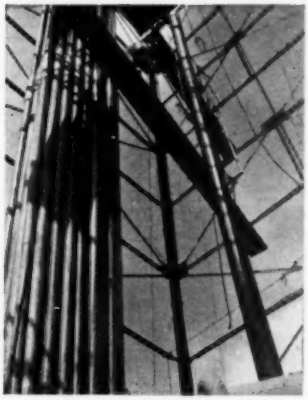
OIL FIELD REPRESENTATIVES

Hercules-Lupfer Engine Sales Co., 124 N. Boston St., Tulsa 1, Oklahoma
V. W. Osborne, 860-A M & M Building, Houston 2, Texas

Farrel-Birmingham®

FB-816


For ALL Your Casing
and Tubing Requirements . . .
Seamless or Welded . . .



Make a note: Electric Weld Casing and Tubing in sizes 2⅜" to 13⅜", grades H-40 and J-55. Seamless Casing and Tubing in sizes 2⅜" to 9⅝", through grade N-80.

. . . . . **NOW SPECIFY**

REPUBLIC

During the past 23 years, millions of feet of Republic Electric Weld Casing and Tubing have been run into shallow wells and deep wells in every field.

Records of performance have established indisputable proof of the ease of running and dependability in service of these products—which today are universally accepted throughout the oil and gas industries.

Now, two new products are added to the Republic Line of Oil Country Tubular Goods—Republic Seamless Casing and Tubing.

A brand-new modern seamless tube mill in Chicago will greatly expand Republic's integrated pipe-making facilities—will provide more casing and tubing for you.

Electric Weld Casing and Tubing are made in sizes 2⅜" to 13⅜", grades H-40 and J-55. Seamless Casing and Tubing will range from 2⅜" to 9⅝", through grade N-80.

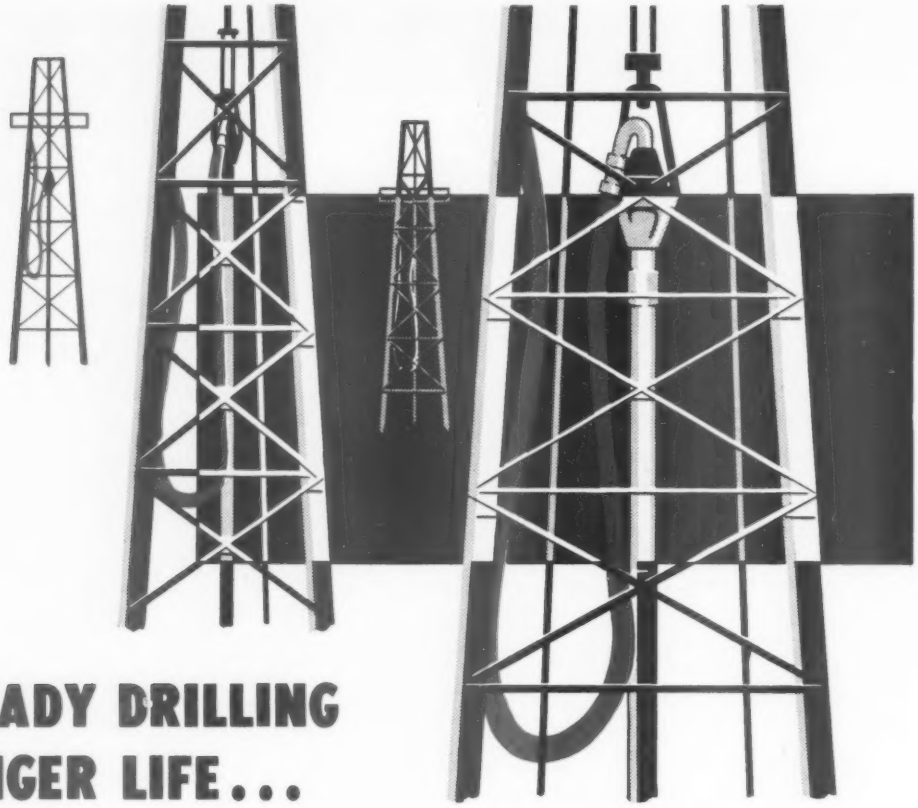
Call your nearest Republic District Sales Office—or write us for further information.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic

REPUBLIC STEEL

CASING AND TUBING
Electric Weld and Seamless



STEADY DRILLING LONGER LIFE...

RAY-MAN ROTARY HOSE

See Our Exhibit
OIL SHOW
TULSA MAY 14-23

How could Rotary Hose be made safer, lighter and more flexible to handle? R/M engineers answered by developing one of the great improvements in the history of rotary hose . . . Ray-Man Rotary Hose • The Ray-Man method of winding high tensile steel wire strength members under precisioned tension permits rotary hose flexibility never before equaled. Strength and steadiness under high drilling pressures give greater safety and longer life than ever before • Other features, like the Lip-Lok seal in R/M's leak-proof, built-in coupling are described in Bulletin 6898. Your nearest National Supply Company representative can tell you how the new Ray-Man Rotary Hose speeds rig work and lowers drilling costs.

DISTRIBUTED BY NATIONAL SUPPLY COMPANY IN ALL PRINCIPAL OIL FIELDS

R/M

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

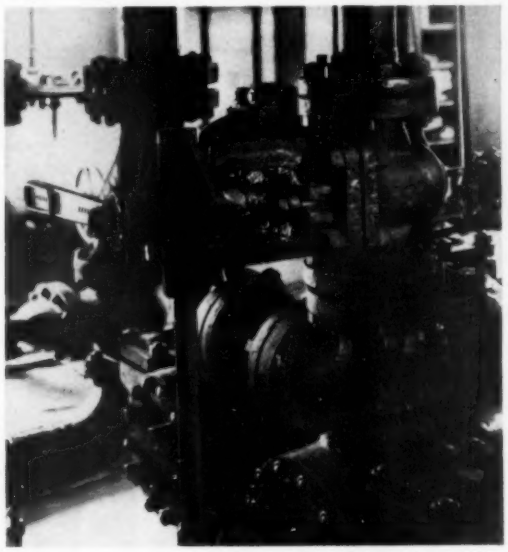
RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks
Clutch Facings • Asbestos Textiles • Sintered Metal Parts • Bowling Balls

Four years maintenance-free service on Propane at 300 pounds pressure—temperatures from 60° F. above to 40° F. below zero . . .

. . . THAT KIND OF PERFORMANCE IS AN "OLD STORY" WITH . . .

HOMESTEAD *Lever-Seald* VALVES



Propane at 300 lbs. pressure, minus 40° F.

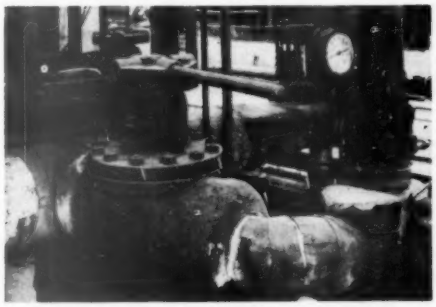
A prominent Mid-Western Oil Refiner* installed a 3", flanged, cast-steel, straightway HOMESTEAD Lever-Seald VALVE on Propane service at 300 lbs. working pressure with a temperature range from 60° F. above to 40° F. below zero. After four years service, with no maintenance except repacking, the valve still held tight.

That sold him—proved to him that HOMESTEAD Lever-Seald VALVES are his "best buy!" Today he is using Lever-Sealds on Propane and on drag lines from stills, another difficult service.

HOMESTEAD Lever-Seald VALVES really lick tough problems, not only in the Processing Industries, but in scores of other industries as well. And wise buyers know that savings effected on difficult services are made in even greater degree on "every day" air, steam, water, gas and oil jobs.

Why don't *you* prove to *your own* satisfaction that HOMESTEAD Lever-Seald VALVES are *your* "best buy," by putting some to work in your plant?

*Names on request.



Drag line from still handling oil and tar at 800° F., 100 lbs. pressure.

For complete technical data and prices, WRITE FOR "VALVE REFERENCE BOOK No. 39." No obligation.

HOMESTEAD
VALVE MANUFACTURING CO.

P. O. BOX 403 — *"Serving Since 1892"* — CORAOPOLIS, PA.

INTER-OFFICE
MEMO
DATE: 4/10/53
Dear Boss:
We like to buy all our needs from Bovaird up here. We get dependable products – and they always have a wide variety; we get good service too, which sure comes in handy during some of these tough operations.
Yours,
DATE: 4/10/53
QUANTITY
1
2
1
4 doz.

SERVICE *Counts!*

"Buy From Bovaird"

TO GET WHAT YOU WANT
WHERE YOU WANT IT
WHEN YOU NEED IT...

SUPPLY BOVAIRD COMPANY

OFFICES AND STORES
ILLINOIS—Clay City, Grayville, Salem
KANSAS—Chase, Great Bend, Pratt, Russell, Wichita
NEW MEXICO—Lovington
OKLAHOMA—Duncan, Oklahoma City,
Pauls Valley, Sapulpa, Seminole, Tulsa
TEXAS—Borger, Dallas, Midland, Odessa, Pampa, Snyder

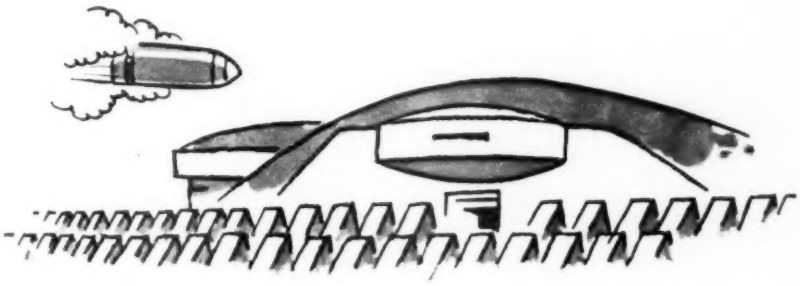
P·E·S·A
PARTNERS IN PETROLEUM PROGRESS

THE *Bovaird* SUPPLY COMPANY

GENERAL OFFICES
TULSA, OKLAHOMA

82 YEARS OF PROGRESS WITH THE OIL INDUSTRY

WALLS CHANGED.....



.....GUNS HAD TO CHANGE TOO!

MODERNIZATION OF SCHLUMBERGER EQUIPMENT KEEPS STEP WITH PROGRESS OF DRILLING AND CEMENTING TECHNIQUES

WHY OPERATORS PREFER SCHLUMBERGER!

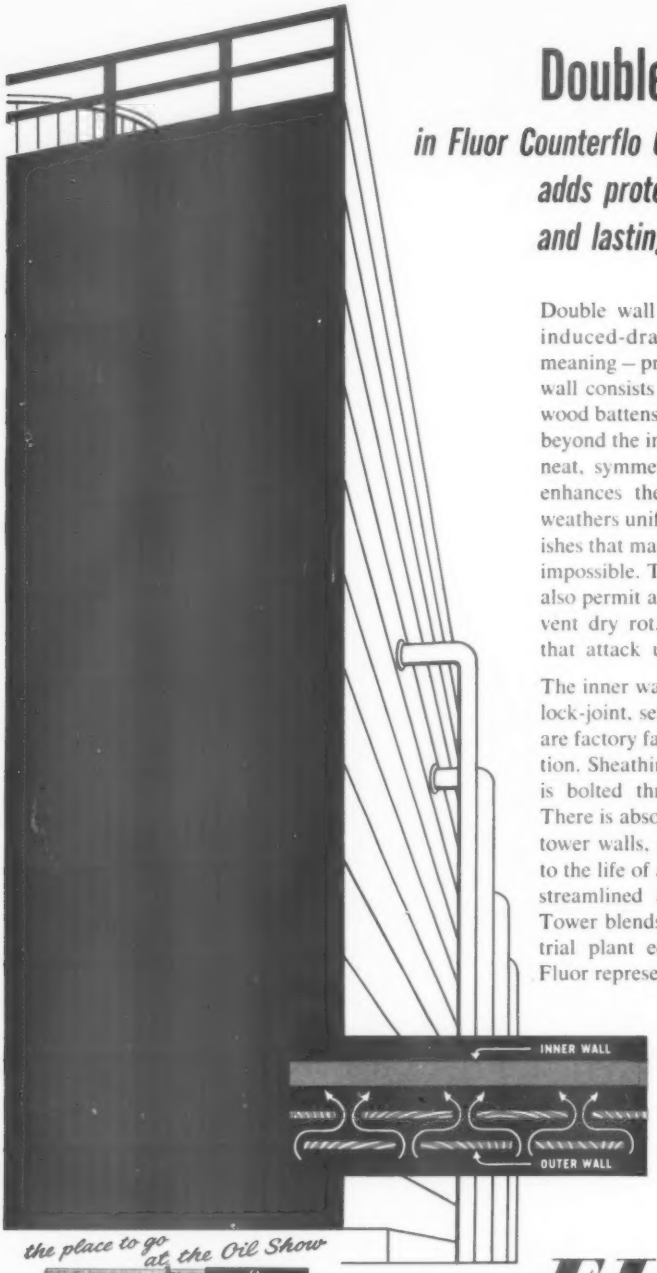
Schlumberger Well Surveying Corp. • Houston, Texas

Double wall sheathing

in Fluor Counterflo Cooling Towers adds protection and lasting good looks

Double wall construction provided on Fluor induced-draft cooling towers has a double meaning – protection and beauty. The outer wall consists of a double row of vertical Redwood battens which are located four inches out beyond the inner wall. This protective casing is neat, symmetrical, eye appealing and greatly enhances the beauty of a cooling tower. It weathers uniformly. Unsightly stains and blemishes that mar a cooling tower's appearance are impossible. The equally spaced rows of battens also permit air circulation around walls to prevent dry rot, algae growth and other blights that attack unventilated cooling tower walls.

The inner wall is constructed from 1 x 6 full Z lock-joint, select "heart" Redwood. Both walls are factory fabricated into panels for easy erection. Sheathing is not nailed to outer posts but is bolted through the main tower columns. There is absolutely no structural load borne by tower walls, another factor which adds length to the life of a Fluor Cooling Tower. The neat, streamlined appearance of a Fluor Cooling Tower blends well with today's modern industrial plant equipment. Contact your nearest Fluor representative, or write for details.



Top view of double wall. The uniform spacing of vertical battens is not for the sake of appearance alone. Air is permitted to circulate between the aerators to prevent dry rot and living organisms from attacking tower walls.

the place to go at the Oil Show

SCIENTIFIC & TECHNICAL BLDG.
BOOTH NOS. 47 & 48

BE SURE WITH **FLUOR**

THE FLUOR CORPORATION, LTD.
LOS ANGELES 22, CALIFORNIA

FOREIGN FACTS: FLUOR-PARIS
FLUOR OF CANADA-TORONTO
FLUOR INTERNATIONAL-BEIRUT
HEAD WRIGHTSON-LONDON

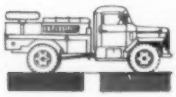
ENGINEERS
CONSTRUCTORS
MANUFACTURERS

NEW YORK
CHICAGO
BOSTON
PITTSBURGH
SAN FRANCISCO
HOUSTON
BIRMINGHAM
TULSA

FWD light-duty LD with all these performance-building advantages can help you

keep work on schedule

The FWD light-duty LD makes an ideal explosives or water carrier, drill or communications truck.



Proper Weight Distribution Only a true 4x4 gives you up to 40% of the weight on the front wheels. This gives you the extra traction needed to work in any footing, any weather.

A Leader for Geophysical Service The LD is the answer for work which conversions and conventional trucks have long sought to do. As a water carrier it makes more trips daily, as a drill truck it reaches more locations, drills more holes daily. Can also be equipped as a shooting or recording truck, or to haul equipment and supplies.

Real Truck Engine—Real Truck Parts The FWD LD is designed and built for rugged use ... pays off in more productive time, fewer breakdowns in field.

High-Climb Oil Sump Keeps oil pump constantly submerged. An FWD exclusive that lets you drill holes on the steepest grades.

For the hundreds of assignments in and around the fields or along the pipelines that require a small, economical, *go-anywhere* truck . . . this light-duty LD has no equal.

Only FWD-built trucks offer so many features that provide *your crews* with a versatile, dependable rig. Only FWD-built trucks have so many advantages which contribute to operating economy and longer, trouble-free service that give you top value for your equipment dollar.

For all the facts, see your FWD Dealer or write direct.

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wis. *Canadian Factory*: Kitchener, Ont.

Built by the makers of America's Foremost Heavy-Duty Trucks

WHY STURDYBILT *Prefabricated* HOUSES ARE *BEST* FOR OIL FIELD HOUSING . . .

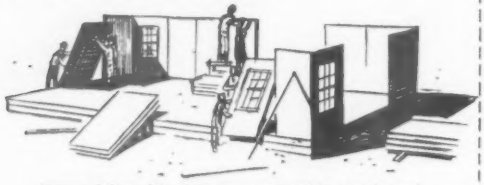
● MOVABILITY

Houses, in complete packages, are moved from factory to site, or from one site to another with a minimum of delay, and practically no loss of material.

● NO WASTE

Material cost is cut to the minimum because YOU PAY ONLY FOR THE MATERIAL USED. Sections are Prefabricated, and material is cut to fit at the factory.

● SPEED OF ERECTION



Houses delivered in sections are erected in days instead of weeks. Thus you save much costly time of on-the-job labor.

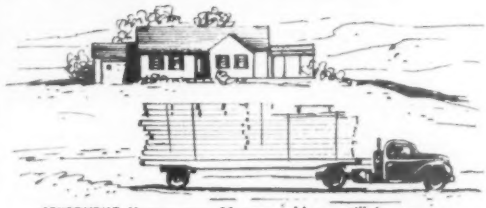
● VARIETY OF DESIGNS

Wall sections can be arranged in so many ways, scores of styles and floor plans from tool houses to warehouses are available.

● WEATHER TIGHT

STURDYBILT sections are precision-built on jigs to assure fitting accuracy. They are tongue and grooved to assure weather-tight construction.

● PERMANENT or TEMPORARY



STURDYBILT Houses over 30 years old are still in use. This record of durability proves that STURDYBILT Houses, although movable, fill the bill for permanent housing.

MANUFACTURERS OF SPECIAL MILLWORK • DISTRIBUTORS OF
JOHNS-MANVILLE BUILDING MATERIALS • CURTIS WOODWORK

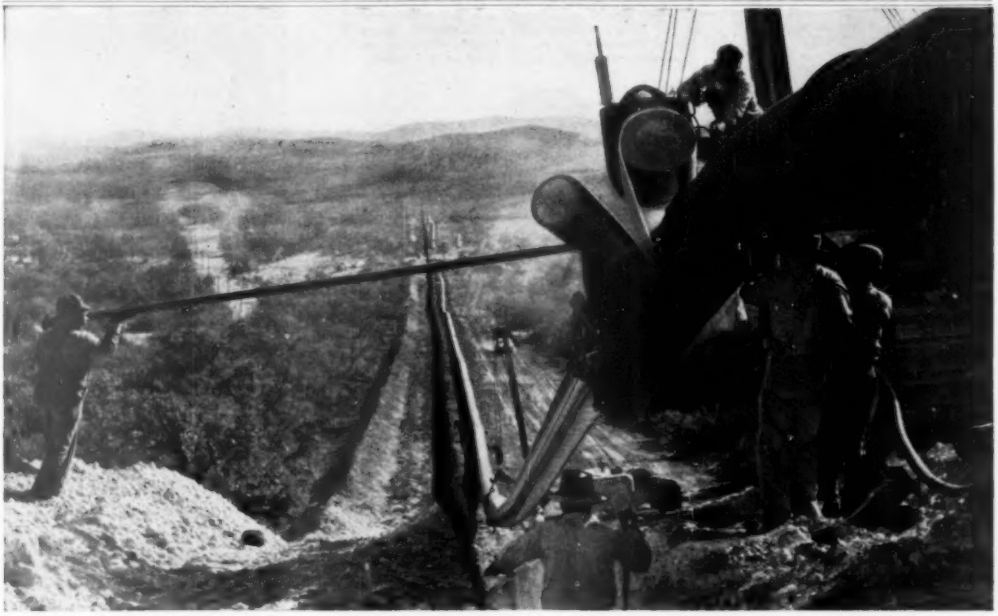
STURDYBILT

PREFABRICATED,
DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125
OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

PIPE LINE PROGRESS



24-inch Rancho Pipe Line increases crude supply to West Gulf Coast refineries

Scheduled to start operation on March 1st, the new large diameter Rancho Pipe Line System, running from McCamey to Houston, Texas, supplies crude oil to Texas Oil Refineries.

Rancho's 467-mile pipe line starts in west Texas sand and caliche, traverses 270 miles of rocky country to the vicinity of Austin, then crosses cultivated fields, rivers, pecan orchards and rice fields to the outskirts of Houston.

Rancho is owned by Shell, Sinclair, Pan-American, Crown-Rancho, Nantucket, Phillips and Ashland pipe line companies. Shell Pipe Line Corporation was responsible for construction, started in March of 1952, and now operates the line. A. O. Smith supplied 340 miles of 24-inch welded steel Line Pipe for this project.

A. O. Smith is proud to have contributed to the development of this and many other large diameter crude transmission pipe lines, making possible greater efficiency and economy in oil transportation.

A. O. Smith Line Pipe is available in a complete range of sizes and wall thicknesses, from 8⅝-in. to 36-in. diameters.

FIRSTS by A. O. Smith: Welded line pipe • Internally expanded pipe • Light-wall large-diameter pipe • World's largest producer of large-diameter welded steel pipe.

The A.O. Smith Casing Mill is operating at capacity to supply vitally needed casing for the Oil and Gas Industry.

A.O.Smith

CORPORATION

LINE PIPE • CASING

Chicago 4 • Dallas 2 • Denver 2 • Houston 2
Los Angeles 22 • Midland 5, Texas • New Orleans 12
New York 17 • Pittsburgh 19 • San Francisco 4
Seattle 1 • Tulsa 3 • Washington 6, D.C.
International Division: Milwaukee 1

DEPENDABILITY THROUGH RESEARCH AND ENGINEERING

IT TAKES A LOT OF MONEY to run a home. Going over their family costs for the year are Mr. and Mrs. Winston P. Corbett of Chicago. Mr. Corbett, an accountant, has been employed by Standard Oil for more than 26 years. Having kept family budgets for 24 years, he knows how important it is for both a family and a business to be on a sound financial basis. In many ways, he says, business and family budgets are much alike.

Where does the money go?

"EVER TRY TO EXPLAIN to your wife what happened to all the money you've earned in a year's time? Well, pleasant or not, reviewing expenditures is something every family is confronted with. And every business, too. I know. I'm an accountant in the Comptroller's Office at Standard Oil and I've put in many an hour on the figures that go into the annual financial report of Standard Oil and its subsidiary companies. I've found that the financial problems of company management are a lot like personal financial problems.

"Like you, Standard Oil took in a certain amount last year—$1,853,709,920 to be exact. Here's what happened to it.

"Most of it—**59.9%**—represented the cost of things we had to buy such as crude oil, materials and services, plus charges made for wear and tear. These items compare roughly to what it costs you to feed, clothe and house your family.

"The next biggest item—even bigger than our payroll—was taxes. Taxes accounted for **17.8%** of what we took in. While that figure includes our own taxes and those we collected from customers for national, state and local governments, it does not include the many 'hidden' taxes that everyone pays.

"Wages, salaries and benefits for our more than 51,000 employees accounted for **15.9%** of the total amount taken in.

"To serve our customers better, we used **3.9%** for investment in facilities such as oil wells, refineries and service stations.

"That left **2.5%**. We paid this in dividends—as a return on the investment of our more than 117,000 stockholder-owners, of whom more than 24,000 are employees.

"That's where all the money went and we feel sure you'll agree it was used to serve you well."

Standard Oil Company

IT TAKES A LOT OF MONEY wisely spent to assure our more than 51,000 employees steady work, above-average earnings and financial protection against such emergencies as sickness and accidents. Modern oil industry equipment, though costly, helps increase the productivity and the earnings of employees like Everett Levitt, above, of our Whiting refinery. A single structure such as a catalytic cracker may cost several million dollars.

IT TAKES A LOT OF MONEY to find new oil reserves. Drilling a well in an unproved area may cost anywhere from fifty thousand to more than a million dollars. There's a big risk, too. On an industry-wide average, the odds are eight to one against a "wildcat" drilling operation discovering commercial quantities of oil. Despite this, Standard Oil is searching continually for new sources of oil, helping to build up the nation's petroleum reserves.

IT TAKES A LOT OF MONEY to provide the distributing system that enables dealers like Bill Mattorozi of Chicago to supply you with gasoline at amazingly low prices. A Great Lakes tanker may cost $5,000,000; one mile of pipeline may cost $35,000 or more; one modern service station can cost $50,000. But because of the great efficiency of such costly equipment, the price of gasoline is about the same today as in 1925, excluding taxes.

5 reasons why PETRECO is your best buy in desalting

1. HIGH QUALITY EQUIPMENT

Petreco pioneered electric desalting, and has spent many years experimenting, developing and perfecting the best desalting process available. Just compare a Petreco installation with any other! Note the spherical treating vessel; it utilizes minimum ground space and yields higher treating capacities. Petreco transformers are specially designed for the heavy demands of desalting service. Petreco's dual electrode system, with independent transformers, gives greater efficiency and dependability. Petreco's specially designed emulsifying equipment and distributor yield maximum treating efficiency with smoothest possible operation. *In short*, you can't get better desalting equipment than that furnished by Petreco. Make your own comparison!

2. ENGINEERING

In addition to the engineering design that goes into every Petreco desalting unit, the Petreco engineering staff cooperates with the refiner's construction staff or contractor all during the desalter installation. This means that there is an experienced Petreco construction engineer "on the job" during construction, to make sure that your desalter is installed according to most modern practice and with no delay.

3. SERVICE

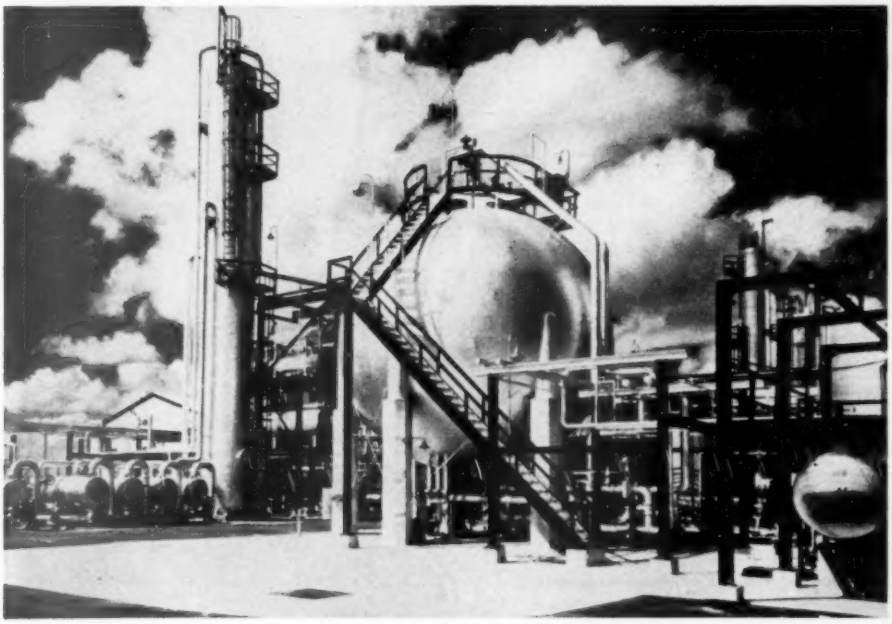
When your Petreco desalter is completed, Petreco desalting engineers make sure that the plant goes on-stream without a hitch by making the adjustments necessary to insure top desalting performance. They instruct refinery personnel in the proper operating methods. Then, with the plant operating smoothly, the Petreco district service engineer takes over the responsibility. Petreco service engineers are trained experts, located wherever Petreco desalters are in use. They are available on twenty-four hour call in case of emergencies.

4. RESPONSIBILITY

The Petreco service engineering staff is a tangible symbol of responsibility. When your Petreco desalting plant goes on-stream, a Petreco service engineer is assigned. He will make sure it operates at the highest levels of safety and efficiency. Petreco responsibility is your assurance of continuing top performance.

5. ECONOMY

The only cheap thing in a Petreco desalter is the cost. The initial installation cost may seem substantial, but when you balance the expense of installation, etc., against the savings, you'll find that a Petreco desalter is the most profitable unit in your refinery. When it starts paying out in terms of longer uninterrupted runs, with more barrels refined per calendar day, the initial cost becomes negligible.



PETRECO

Complete facts on Petreco desalting are yours for the asking. Just write or call

PETROLITE CORPORATION

PETRECO DIVISION

3202 SO. WAYSIDE DRIVE, HOUSTON 1, TEXAS

1390 E. BURNETT ST., LONG BEACH 6, CALIF.

***Visit Our Exhibit* I. P. E. - TULSA - MAY 14-23**

PS 53-2

THIS YOUNG TUBE-AND-FIN CORE PAYS A BONUS!
● PERMANENT, PERFECT BOND BETWEEN TUBES AND FINS
● GREATER HEAT TRANSFER EFFICIENCY
This die-formed collar provides a tight, permanent bond along entire length of tube as shown in cross section at left.

Here's why Young-designed and built tube and plate fin cores give greater heat transfer efficiency . . . stand up better under peak capacity operation . . . pay bigger dividends in longer trouble-free service. The outstanding design and construction of the Young plate type fin core, shown above, features specially die-formed reinforced collars which make a continuous, *permanent* bond between fins and tubes . . . providing maximum heat transfer and greatly stronger, longer-lasting cores.

This mechanical structure of greater strength which permits the use of the most desirable metals chosen for the job — copper, aluminum or other alloys — is attributable to Young's precision-manufactured, high-quality cores.

Whatever your need, consult your nearest Young Sales Representative to help you select correct cores — types and sizes — and discuss any phase of your heat transfer problems.

OIL FIELD REPRESENTATIVES:
TULSA: J. R. Meek Company, 1341 S. Boston St., Rm. 109
LOS ANGELES: Flournoy & Everett, Inc., 5043 Santa Fe Ave.
MUSKEGON: Harold J. Young, 206 Montgomery Bldg.
Other Representatives in Principal Cities

One of our many important installations is the Reynolds Metals Company's new San Patricio, Texas plant which uses more than 80 Young units featuring the new "bonus" core for cooling engine jacket water and lube oil, and 91 additional units of Young variated, specially designed construction.

1927 · 1952

YOUNG

Heat Transfer Products for Automotive and Industrial Applications.

Heating, Cooling, Air Conditioning Products for Home and Industry.

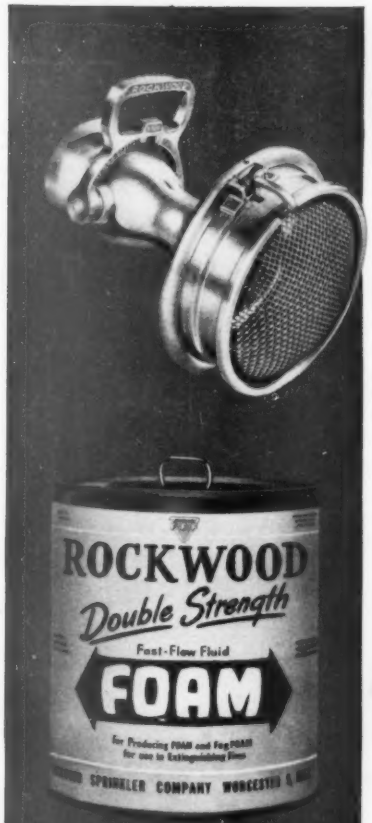
YOUNG RADIATOR COMPANY

Dept. 205-D • RACINE, WISCONSIN
Factories at Racine, Wisconsin and Matteson, Illinois

Cut Your Fire Losses

With This Tested

Rockwood Equipment



ROCKWOOD TYPE FFF FogFOAM NOZZLE WITH FogFOAM SCREEN puts out large fires in gasoline, benzol, and other highly volatile flammable liquids. Provides far greater extinguishing action than ever before possible with old-style chemical or mechanical foam equipment. Used in industrial plants, oil transport companies, refineries, airports, and municipal fire departments. Three sizes for service on 1½", 2½", and 3½" fire hose lines.

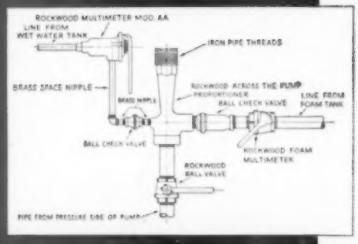
Nozzle provides three different discharges . . . FogFOAM with *screen* (shown), solid FOAM stream with *foam shaper* (not shown), and/or high-velocity WaterFOG by shutting off FOAM liquid. Through Fog-FOAM screen, 2½" size discharges 200 gpm @ 100 psi. Range: approximately 30 feet. Approved by Underwriters' Laboratories, Inc.

ROCKWOOD DOUBLE STRENGTH, FAST-FLOW FLUID FOAM LIQUID (3%) extinguishes large spill fires in gasoline with maximum speed and safety to firemen. More fluid, faster spreading. Mixed with 97 parts water, it forms excellent foam blanket that quickly re-seals if broken. Flows freely at sub-zero temperatures (−15°F). Clings to metal surfaces as an insulator. Will not cause corrosion and is easily washed off.

Used with fire hose line nozzles and permanently piped FogFOAM and FOAM installation. Comes in 5-gallon cans or 50-gallon drums.

Approved by Underwriters' Laboratories, Inc.

Regular Rockwood FOAM Liquid (6%) also available in 5-gallon cans or 50-gallon drums.



ROCKWOOD MODEL DUAL "B" AROUND-THE-PUMP PROPORTIONER automatically feeds FOAM liquid or wetting agent into hose lines. Eliminates waste, assures accurate mixing. Used when pressure is maintained by a pump from draft supply or booster tank. Operates in range from ¾" booster lines to 2½" hose lines.

Multimeter settings admit proper amounts of wetting agent for varying nozzle discharges and solution strengths — metering valve serves same purpose on FOAM side of eductor. Ball check valve prevents water from backing into FOAM liquid container.

Maximum nozzle discharge when using FOAM liquid: 200 gpm — when using 1% wetting agent solution: 100 gpm.

Custom-engineered proportioning systems for all mobile equipment are also available.

GET YOUR COPY of this informative, illustrated, 12-page booklet on Rockwood Fire Fighting Products. Write direct to Rockwood Sprinkler Company, 104 Harlow Street, Worcester 5, Massachusetts.

ROCKWOOD

ROCKWOOD SPRINKLER CO.

Engineers Water...to cut fire losses

When the pressure's on

Another trainload of huge Pressure Vessels leaves Sun Ship's Chester plant.

If you're ever in the market for large high-pressure tanks—that's a good time to think of Sun Ship.

Construction of these giant tanks . . . whether for operating or for storage under pressure . . . whether for land or marine installation . . . has been an important part of Sun Ship's work for the petroleum and chemical industries for many years.

The trainload shown above, which includes tanks of 55,000-gallon and 30,000-gallon capacities—used for storing L.P.G.—typifies Sun Ship's experience in building large tanks which must carry pressure.

Shipments of these and of other huge vessels in carloads or trainloads is a familiar sight at the busy Chester plant. Fractionating towers, stills, catalytic cracking cases, reactors and other specialized equipment are turned out at Sun Ship's great and versatile plant on the Delaware, from which shipment can be made either by rail or by water.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.

25 BROADWAY • NEW YORK CITY

There's an

MINNEAPOLIS MOLINE
OILFIELD POWER

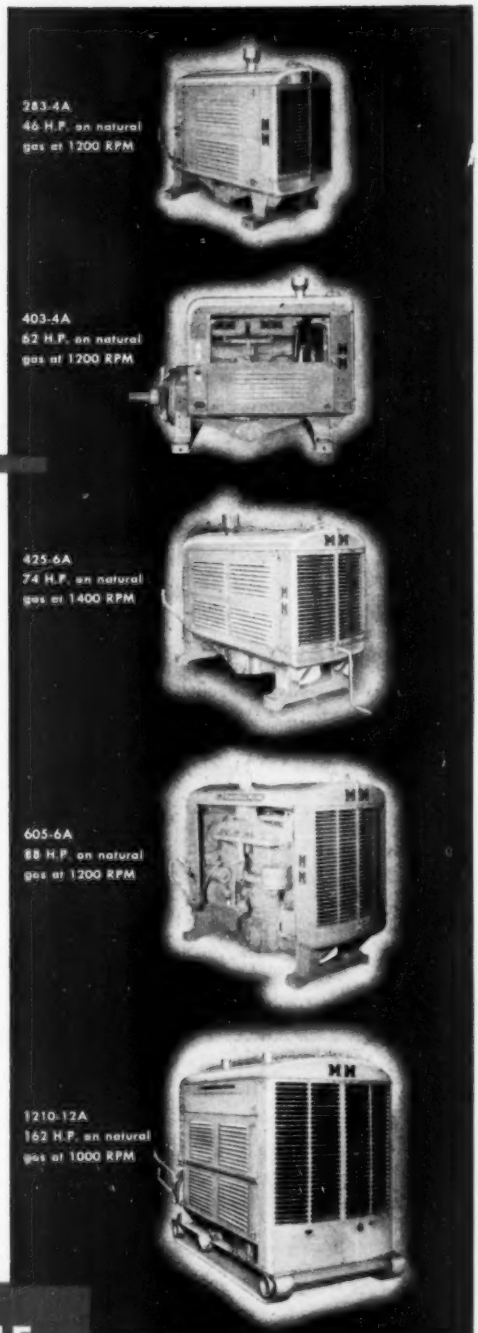
POWER UNIT

to fit every oilfield job!

*R*ugged parts design that gives you *longer* engine life, continuous performance . . . slow-speed operation with a *reserve* of *work-power*—these are the things you get with MM Power Units. *But that's not the whole story!* MM owners and users will tell you that MM Power Units are *quality* engineered to deliver *low-cost* power.

These advantages have helped to build MM's enviable reputation: Accurately controlled cooling of the high-turbulence combustion chambers; positive lubrication and water jacketted base pan that maintains constant oil temperature to prevent formation of engine-wearing sludge; metered vacuum crankcase ventilation; automatic cut-out on cooling and lubricating systems. These features have helped, but what is more important are the materials and workmanship of construction, the fine tolerances, the larger bearing surfaces . . . briefly put, it's the *integrity* that's built into MM!

Your dollars can purchase no more. Can you afford to invest in less?


283-4A
46 H.P. on natural gas at 1200 RPM
403-4A
62 H.P. on natural gas at 1200 RPM
425-6A
74 H.P. on natural gas at 1400 RPM
605-6A
88 H.P. on natural gas at 1200 RPM
1210-12A
162 H.P. on natural gas at 1000 RPM

See us at the
INTERNATIONAL PETROLEUM EXPOSITION
TULSA MAY 14-23

DISTRIBUTED BY—

SHRIMPTON
MANUFACTURING & SUPPLY CO.

LOS ANGELES • OKLAHOMA CITY • KILGORE
Tel: Angelus 1-5122 Tel: 33284 Tel: 1241

ODESSA, TEXAS
Tel: 7-4088

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

Canadian Distributor:
Disher-Winslow (Alberta) Ltd.
Edmonton, Alberta

How Layne assures your water supply

UNDIVIDED LAYNE RESPONSIBILITY MEANS COMPLETE SERVICE, LOWER COSTS

Layne surveys and test wells

Layne's *complete* service begins long before the wells are drilled . . . with geological surveys made in cooperation with engineers of the client company or municipality. Test-hole drilling shows actual conditions.

Layne analyses and recommendations

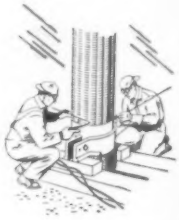
Samples taken from the test holes go to Layne's central laboratories, where technicians report on the earth structure and qualities of the water. From these reports, water-system recommendations are made.

Layne-engineered pumps, screens, casings

Into every Layne well goes equipment designed for the specific job—the finest equipment, produced with the greatest economy, because of Layne's thorough engineering skill and world-wide experience.

Layne installation and maintenance service

Skilled Layne workmen handle every stage of the job—assuring a system custom-engineered for your own situation. And Layne's experience is always at your service for any maintenance work you may need.



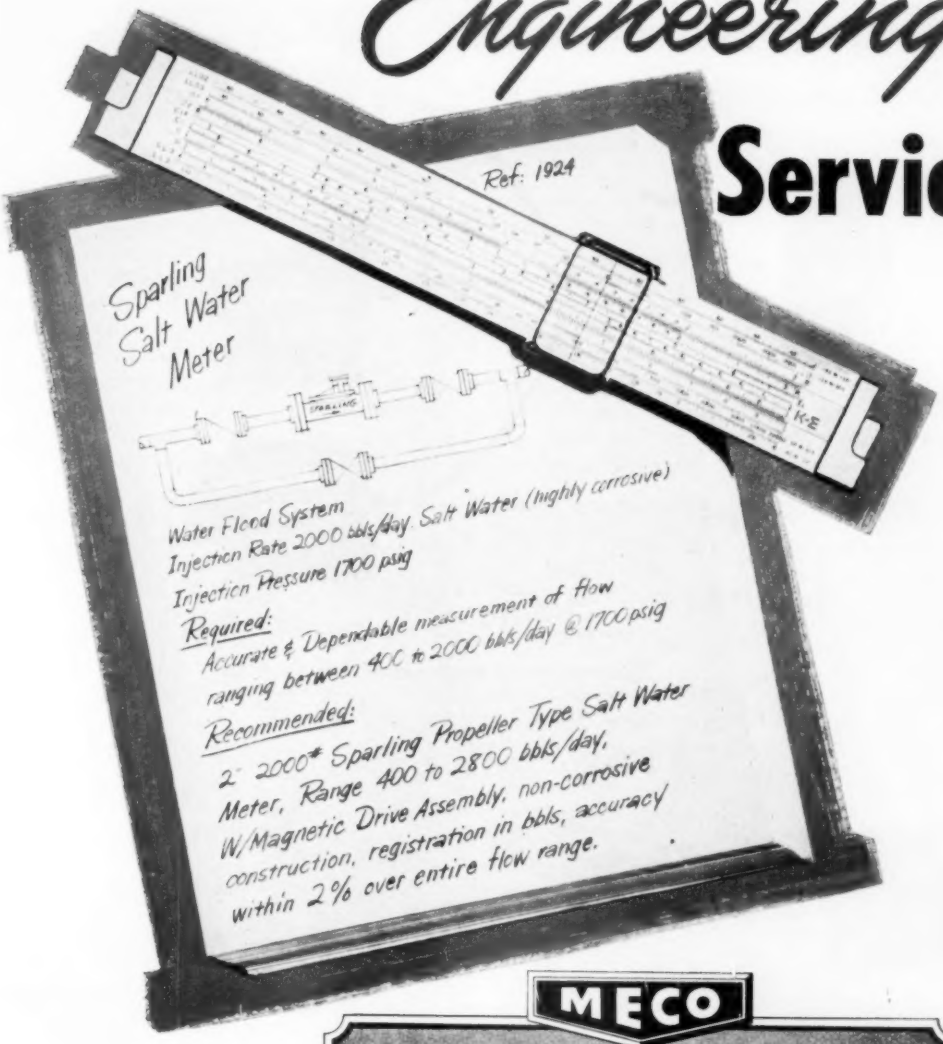
Let Layne help you plan ahead on your water needs

Layne welcomes the opportunity to share in long-range planning for your water-supply needs. For information on any phase of well water supply or pump equipment, contact your nearest Layne Associate Company or write Layne & Bowler, Inc., General Offices, Memphis 8, Tenn.

WATER WELLS • VERTICAL TURBINE PUMPS
WATER TREATMENT

Layne Associate Companies Throughout the World

Equipment with *Engineering* Service



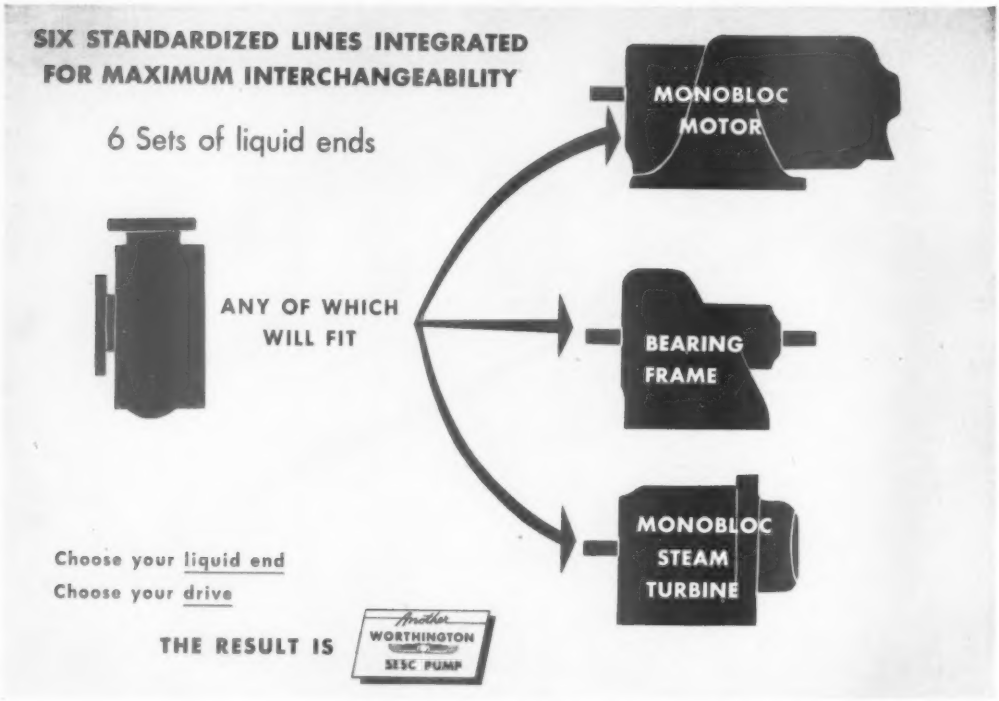
MECO

MAINTENANCE *Engineering* **CORPORATION**

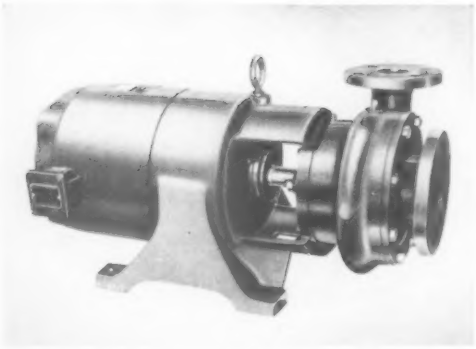
P. O. BOX 2637

3711 CLINTON DRIVE
HOUSTON, TEXAS

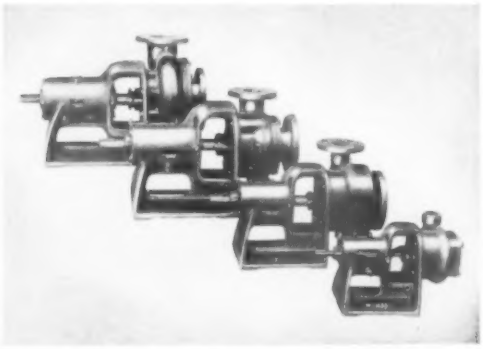
How Worthington makes



WORTHINGTON STANDARDIZATION assures you the one *right* pump for every job. Most "specials" can be assembled from standard parts and shipped to you without delay.



THE WORTHINGTON MONOBLOC, the pump with a built-in motor, has long been famous for its compact, streamlined design. It handles many different jobs because it uses any of the six liquid ends that are interchangeable and can be equipped with either conventional packing or mechanical seal.



FRAME-MOUNTED PUMPS use the same rugged mounting as the monobloc units and the six liquid ends fit in four frame sizes. Like the monoblocs, they use a standardized mechanical seal that can easily be changed in the field if necessary. They'll take any kind of drive readily available.

standard pumps do special jobs

Worthington's SESC* line provides for "custom" assembly from standardized parts with standardized mountings, materials and dimensions to give you exactly the centrifugal pump you need

When you order a Worthington centrifugal pump you get the one *right* pump for the job without compromise, without long delays and without paying a premium for a pump to meet "special" requirements.

Worthington can assure you this, because Worthington can assemble any of 60,000 *different* standard pumps, covering virtually every possible application, from 650 standardized parts. Nearly all *special* pumping needs can be filled with a Worthington *standard*.

Worthington SESC centrifugal pumps are husky and well-built—not flimsy, light-duty units. In fact, users find them of better construction than is usually available in custom jobs at higher prices.

To sum up, you can expect the following advantages when you buy Worthington centrifugal pumps:

- **Greater availability,** since Worthington is equipped to handle more requirements with a *standard* unit.
- **Broader selection** of ratings and special design features.
- **Easier servicing** with lower parts-inventory requirements.

Contact your local Worthington distributor or nearest Worthington district office. Worthington Corporation, Centrifugal Pump Division, Harrison, New Jersey.

*SESC—Standardized End Suction Centrifugal C.2.14

MANY YEARS OF DEVELOPMENT WORK coupled with Worthington's 112-year pumping experience has led to the development of the present Worthington line of centrifugal pumps. This is a view of a section of Worthington's Engineering Department which includes specialists in virtually every field of industry. C.2.14

The World's Broadest Line Assures You The Right Pump For Every Job

WORTHINGTON

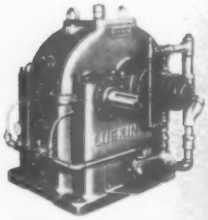
Centrifugal Pumps

A Name SYNONYMOUS with Quality

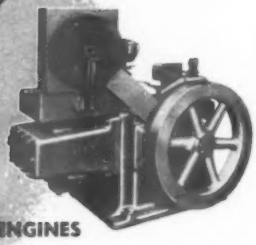
PUMPING UNITS

GEARS

LUFKIN



SPEED REDUCERS AND INCREASERS



GAS ENGINES

TRAILERS

Lufkin FOUNDRY & MACHINE COMPANY

LUFKIN, TEXAS

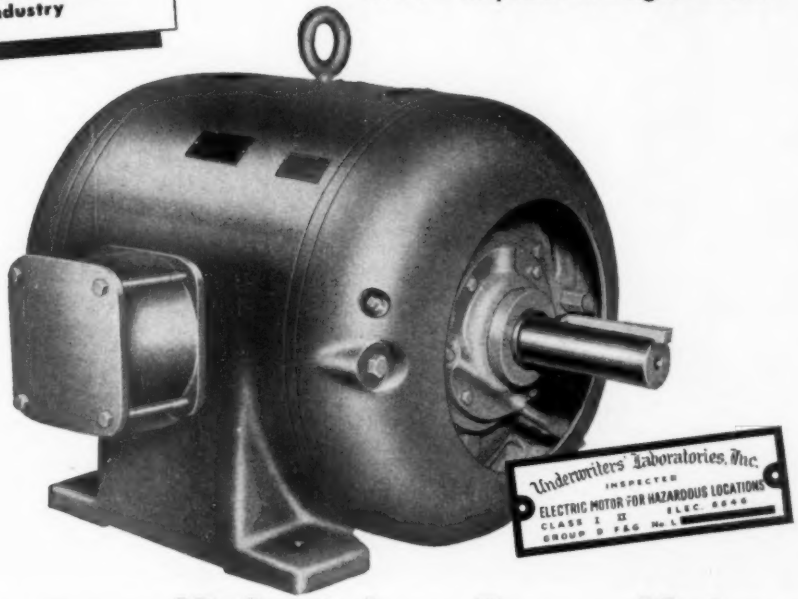
Branch sales and service Houston, Dallas, New York, Tulsa, Los Angeles, Seminole, Oklahoma City, Corpus Christi, Odessa, Kilgore, Wichita Falls, Casper, Wyoming; Great Bend, Kansas.

Lufkin Equipment in CANADA is handled by

THE LUFKIN MACHINE CO., LTD., 14321 108th Avenue, Edmonton, Alberta, Canada.

Wagner
ELECTRIC MOTORS
... the choice of leaders in industry

... where corrosion is a problem
... where explosion might occur



Wagner Type JP Cast Iron Frame Motors

Wagner type JP cast iron frame motors are built for use in chemical plants, oil fields, refineries, steel mills—for any application where corrosive and explosive conditions might prevail.

These rugged motors are totally-enclosed in rust- and corrosion-resistant cast iron. They are fan-cooled by an externally mounted blower, made of non-sparking bronze, that forces air through ventilating passages in the frame. They feature completely protected laminations . . . special varnish treated windings . . . a running shaft seal . . . and an explosion-proof conduit box with machined fits.

A standard type cast iron frame motor (for applications where protection against explosion is not required is also available. Both types are built in ratings from 2 to 250 hp, with either normal or high torque characteristics.

Wagner Bulletin MU-132 gives complete information on these protected motors. A nearby Wagner engineer can help you select a Wagner Motor to meet your most exacting specifications. Consult the nearest of our 32 branch offices, or write us.

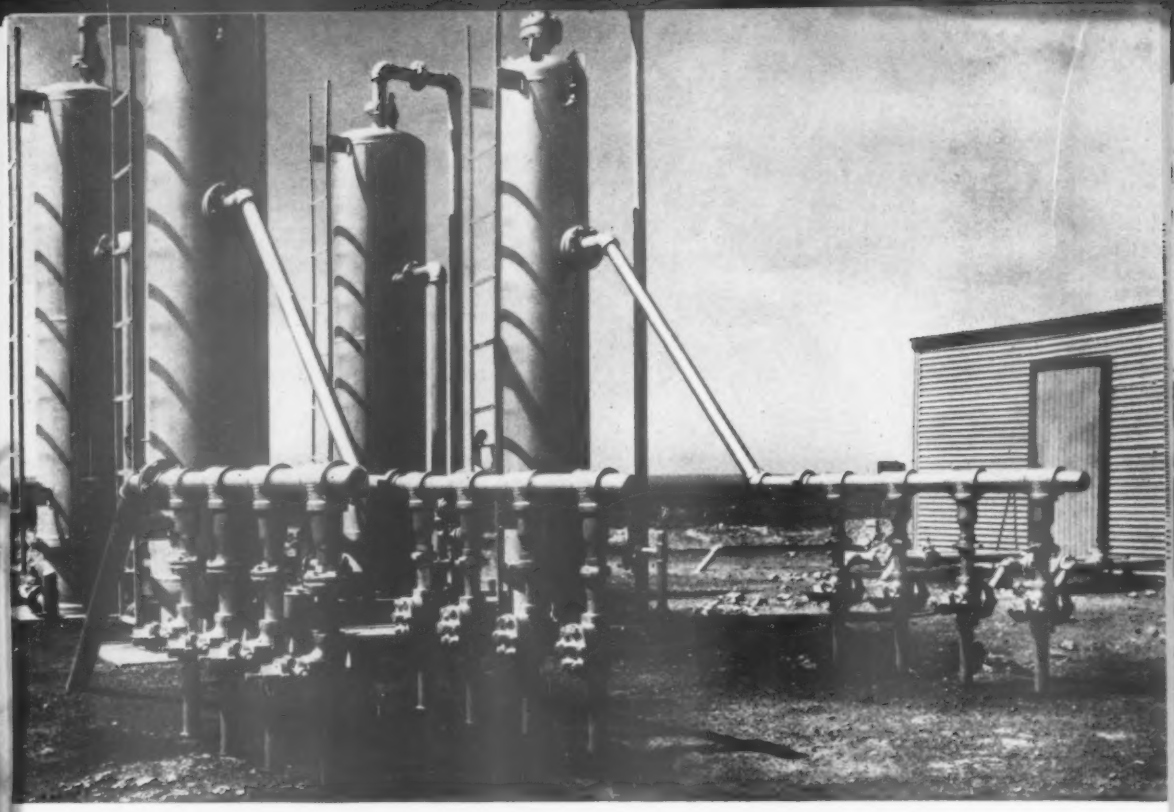
®Wagner Electric Corporation
EST. WE 1891

WAGNER ELECTRIC CORPORATION
6389 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

Don't miss Wagner's exhibit at the International Petroleum Exposition, Booths 35 and 36, California Building.

M53-9



NORDSTROM DEPENDABILITY . . .

Where Valve-Protecting *Lubricaut* Counts The Most

Because production services are so often located in remote, out-of-the-way fields, trouble-free valve performance takes on added importance. That's why you find Nordstrom valves on so many production services.

Nordstrom's valve-protecting film of lubricant assures positive closure, longest valve life and instant, easy operation.

Don't become involved in the costly and irritating problems of valve breakdown at remote installations. Install Nordstrom lubricant-sealed valves on all of your production services. Rockwell Manufacturing Company, Pittsburgh 8, Pa.

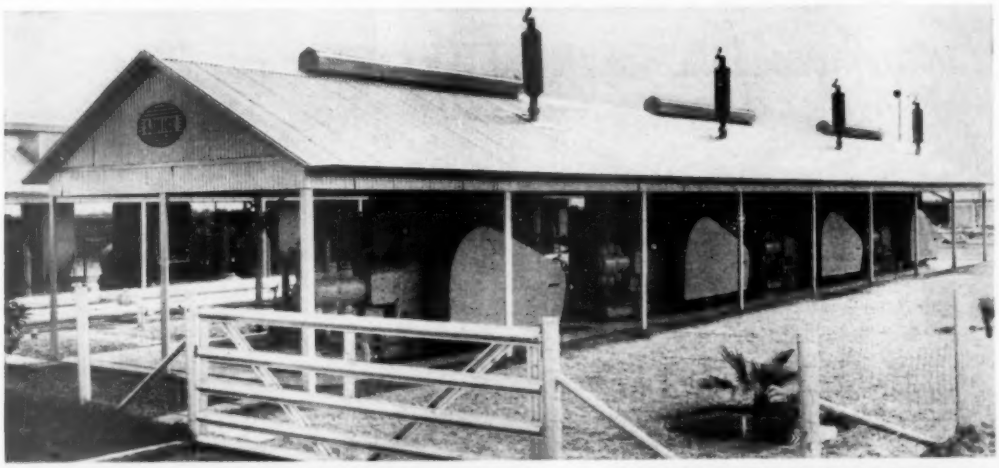
ROCKWELL Built Nordstrom Valves

Lubricant-Sealed for Positive Shut-Off

Wherever you are in the oil fields, you're close to a supply house with Nordstrom valves and Nordstrom service.

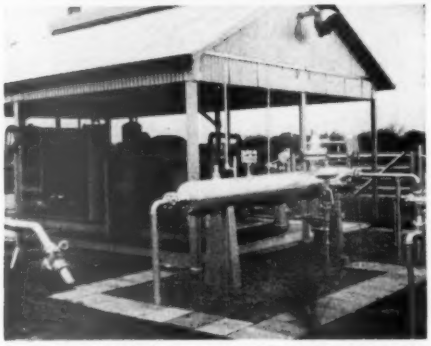
Another ROCKWELL Product

DRIVING Wilson Supply—Ingersoll-Rand Portable COMPRESSORS in Southern Minerals Corp. Southwest Texas RE-PRESSURING PLANT...



WAUKESHA ENGINES

207

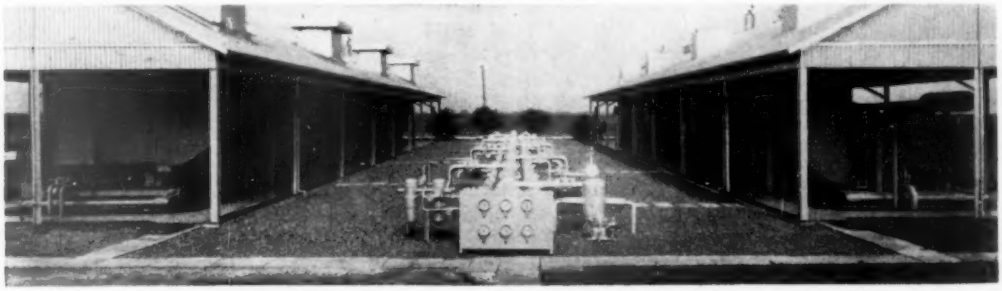


(Above) Model 145-GKU, 6-cyl., 5¼-in. x 6-in., 779 cu. in. Waukesha Gas Unit, powering a 3½-in. x 11-in. portable compressor. Maximum horsepower on natural gas, 145 @ 1600.

go 25,000 Hours Without Overhaul

In this plant, where millions of cubic feet of gas are re-pressured for main line transmission, every day Waukesha Gas Power Units are running up remarkable records in continuous service. Of the thirteen Waukeshas driving the plant's portable compressor booster units, several Waukesha Engines have run more than 25,000 hours *without an overhaul!* Two of the thirteen Waukeshas have been overhauled, however—one after 24,552 hours; the other after 20,160 hours. The load is 6-7 inch vacuum three-quarters of the time. Send for Bulletin 1079. *Waukesha Motor Company, Waukesha, Wisconsin; New York, Tulsa, Los Angeles.*

(Below) In major installation, eight 6-WAKU, 6-cyl., 6¼-in. x 6½-in., 1197 cu. in. Waukesha Gas Units power four 9½-in. x 13-in. high stage and four 5¾-in. x 13-in. low stage compressors. Maximum horsepower on natural gas, 202 @ 1500.



Better ANY WAY YOU LOOK AT IT...

AMERICAN "*Every Angle*" DIAL THERMOMETER

The American "Every Angle" Dial Thermometer is easy to install and turn to any position for accurate face-to-face readings. Specify the "Every Angle" — indoor or outdoor design — and this unbeatable feature combination is yours:

DEPENDABLE ACCURACY. The "Every Angle" Thermometer is made of precision-machined, non-corrosive materials and operates by vapor pressure. It is precisely calibrated against certified standards to assure the most critical reading in the upper third of the dial, where the graduations are farthest apart.

CONVENIENCE. Dial face can be rotated 180° and tilted 180° for accurate reading at the most convenient angle.

WEATHER-PROOF DESIGN. *Screw-type ring* with tight-fitting gasket for weather-proof outdoor service; *slip ring* design for indoors.

REINFORCED MOUNTING. Heavy-gauge swivel hinge has a *stainless steel kingpin.* Reinforced connection between hinge and bulb. Greater strength and corrosion resistance, long service life!

EASY INSTALLATION. Socket connections have compression-type bushings. No costly jigs needed — connection easily welded to tanks or other irregular-shaped equipment.

Ask your Distributor to help you select the American "Every Angle" Dial Thermometers with the proper temperature ranges for your needs. Phone or write him today.

SPECIFICATIONS

NON-CORROSIVE DIAL CASE: Non-corrosive aluminum with smooth black finish. No protruding screw heads. Nickel-plated brass cup houses coiled capillary tubing.

DIAL: 3½" diameter. White with black figures. **POINTER:** Black, adjustable. **FRONT:** Heavy plate glass. **MOVEMENT:** Bronze or stainless steel. **BULB AND STEM:** Stainless steel. **SIZE CONNECTION:** ½", N.P.T. **STEM-LENGTHS:** 3", 5-5/16", 12", 18" and 24". **SEPARABLE SOCKETS:** Bronze, carbon steel or stainless steel.

STANDARD RANGES

Fahrenheit	
—60 to 20°	30 to 300°
—20 to 120°	100 to 300°
40 to 140°	90 to 350°
30 to 180°	190 to 390°
20 to 220°	260 to 450°
Centigrade	
0 to 100°	40 to 150°

YOUR INDUSTRIAL DISTRIBUTOR makes it his business to see that you get the best possible equipment. That's why he handles only products of proved quality and dependability — like Manning, Maxwell & Moore products.

AMERICAN INDUSTRIAL INSTRUMENTS

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES. BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

The strongest rack bar makes the toughest jack

the Roustabout "1523"

A ratchet jack like the Duff-Norton all-purpose Roustabout "1523" is no stronger than its rack bar, the notched steel "heart" that moves up and down holding the load. The rack bar on this 15-ton capacity oil field jack is stronger and tougher than the rack bar on any other ratchet jack of this type. It's *stronger* because it's *larger!*

Next time you see a Duff-Norton ratchet jack, examine the rack bar; you'll notice it's oblong like this: ▬ . Then look at the rack bar on any other make ratchet jack. It's smaller, square like this: ■.

So you get the most and best for your money with a Duff-Norton Jack.

Ask your supply store salesman for the Duff-Norton Roustabout "1523." He has it in stock or can get it for you quickly. For complete specifications on this and other dependable Duff-Norton jacks, write the world's oldest and largest manufacturer of lifting jacks for special Oil Field Jack Bulletin, AD19-B, the Duff-Norton Manufacturing Co., P.O. Box 1889, Pittsburgh 30, Pa. Canadian plant—Toronto 6, Ontario.

DUFF-NORTON

Jacks

"Giving Industry A Lift Since 1883"

EARL L. MANNING *has been a Party Chief with Independent for 9½ years. With the Company for 18 years, he has progressed through virtually every job on a field party, and has a total of 24 years of experience in geophysical work.*

Only Seasoned Men can provide the experienced service you get from Independent

Founded in 1932, Independent Exploration Co. is one of the oldest exploration contractors in the industry operating continuously under the same ownership and management. And Independent ranks high in the individual experience terms of the men who serve you, a factor responsible in a large measure for the success and value of any geophysical survey.

You are invited to avail yourself of Independent's experienced organization whenever we can be of service.

POINTING THE WAY IXC FOR THE DRILL

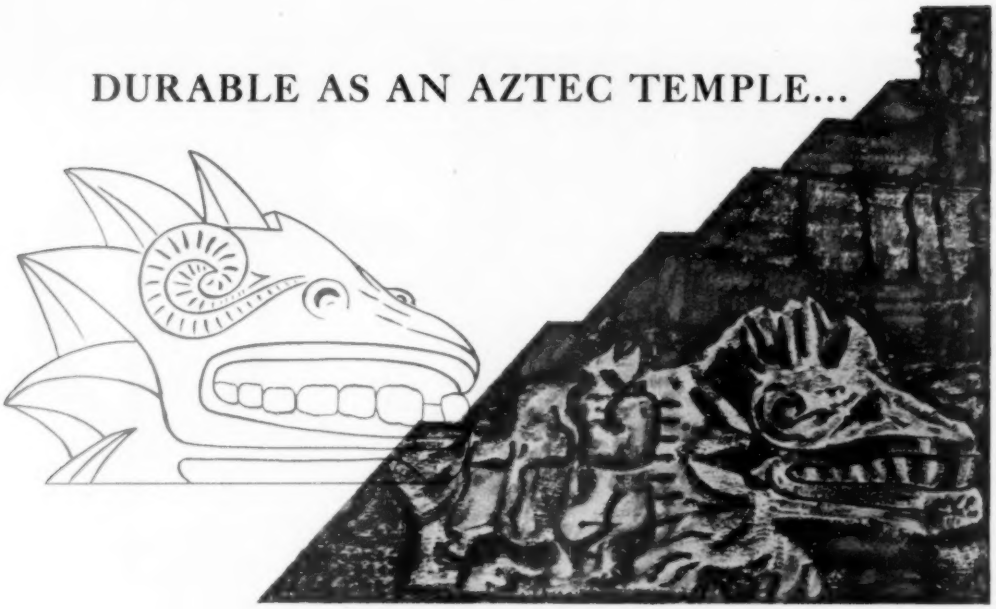
Independent *Geophysical Surveys*

EXPLORATION COMPANY

1973 WEST GRAY ★ HOUSTON, TEXAS

ESTABLISHED 1932

DURABLE AS AN AZTEC TEMPLE...



wells cemented with HALLIBURTON'S POZMIX

This new, remarkable blend of pozzolanic materials and neat Portland Cement has a centuries-old history. The Romans and Aztecs first utilized the chemically active pozzolans, but even they failed to fully understand the strength the volcanic ash would display down through the years.

Today, their ancient temples and aqueducts, still standing, offer silent testimony to the durability of the pozzolans. And this same durability, this same time-tested toughness is going into oil wells cemented with Halliburton's Pozmix.

A growing number of operators find there are several reasons why Pozmix is able to perform a superior job for them. Chief among these is that Pozmix:

- **Resists sulfates and acid waters.**
- **Sets with a lower density.**
- **Pumps at lower pressures.**
- **Shows less heat hydration.**
- **Possesses greater resiliency.**

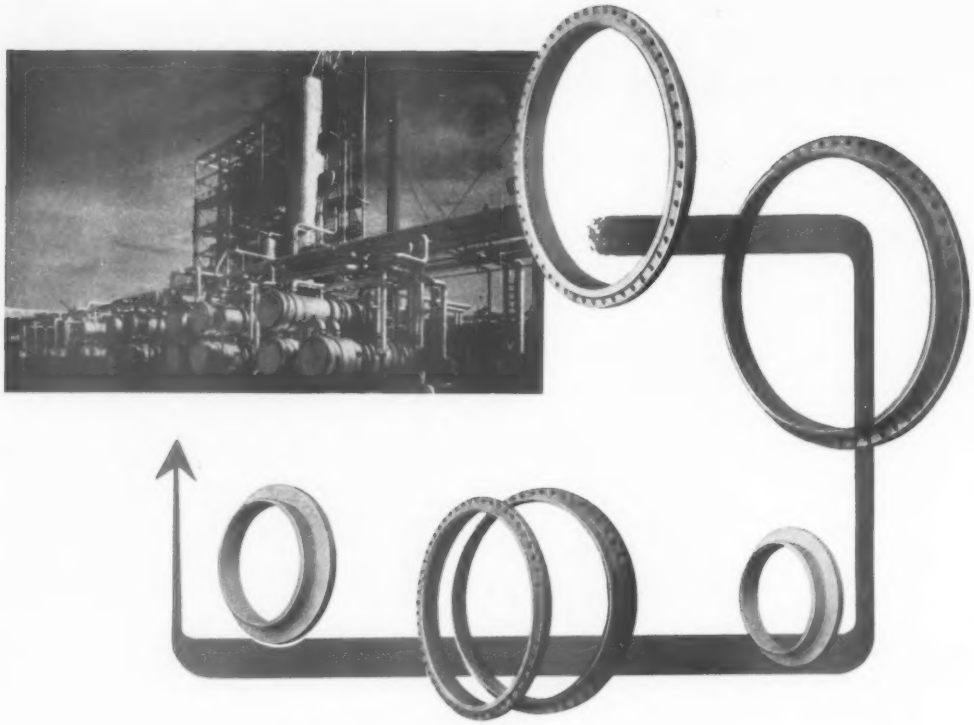
This ability to minimize adverse effects of deep well temperatures, pressures, formation chemical reactions, and drilling fluids is the key to its success in the oil fields.

And—*this slurry actually costs less.* Pozmix saves money on initial cost and in holding remedial work to a minimum.

Your nearby Halliburton representative can explain the many technical advantages and money saving benefits of Pozmix. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN OIL WELL CEMENTING



there's a **Railway Steel Flange**

for your application!

Railway Steel flanges are made from carbon and alloy steels for just about every job in the petroleum, chemical, petrochemical, and gas industries where large-diameter flanges are required . . . all the regular standard types of flanges, as well as special types, including those built to TEMA standards. Railway Steel flanges are available in a wide range of sizes and types from 18 in. ID to 150 in. OD.

Our own high quality carbon and alloy steels are used in the production of Railway Steel flanges. Every step in fabrication from the production of the steel through forging, rolling, heat treating and machining is under rigid control to assure you flanges that will give maximum protection to your products and processes.

Sales representatives in Chicago, Cleveland, Houston, New York, Richmond, San Francisco, St. Louis, St. Paul and Tulsa* will be glad to provide complete information about these superior flanges for your applications.

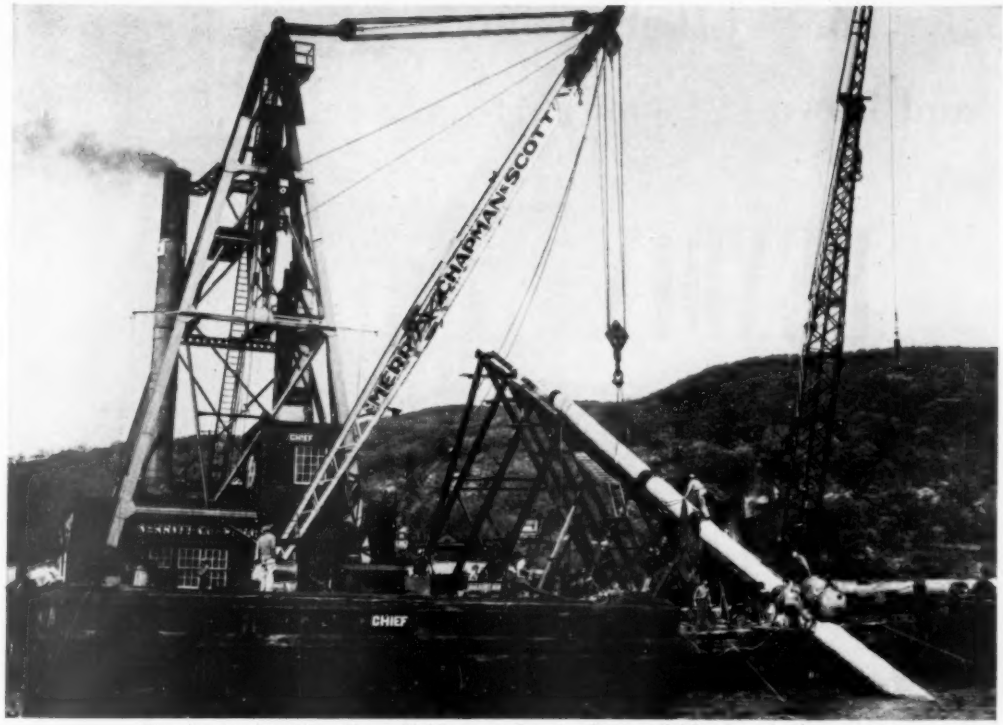
**Ardun Supply Company*

Brake rims, gear blanks and other circular forgings are also available for many types of service. Use of our own steel assures complete dependability and long service life.

Railway Steel Flanges

RAILWAY STEEL-SPRING DIVISION

AMERICAN LOCOMOTIVE COMPANY



Three lengths of Bethlehem Pipe, welded into a 120-ft section, being readied for trip to river bottom.

STEEL PIPE RIDES *CHUTE-THE-CHUTE*

140-ft Incline Used in Linking Gas Line to River Bottom

Here was the problem: To build two gas pipelines on the bed of the Hudson River, connecting Tompkins Cove and Indian Point, N. Y. Purpose: The mile-long lines, 65 ft beneath the surface at their deepest point, were to serve as an underwater link in an extension of the "Big Inch," so that natural gas could be piped to New England. Owner: Algonquin Gas Transmission Company, with Ford, Bacon & Davis, Inc., engineers, acting as agent.

Left to right: James T. Denton, general superintendent, William Hepworth, project manager, and Taylor MacElroy, project engineer, all of Merritt-Chapman & Scott Corporation; James Hardy, superintendent, Hallen Co., welding subcontractors; Peter New, resident engineer, Ford, Bacon & Davis, Inc.

In handling this phase of the project, Merritt-Chapman & Scott, contractors, constructed a floating pipe skid. This chute-the-chute type of apparatus was 50 ft high at one end, and its incline sloped toward the water at a 20-deg angle. The 40-ft lengths of steel pipe were welded into 120-ft sections weighing about 35 tons. They were then placed in the trough and eased beneath the surface, supported at intervals by pontoons. The pipe used was Bethlehem 24-in. Gas Pipe.

Bethlehem Pipe is the ideal pipe for the distribution of gas or oil because it is sound, has great beam strength, and is leak-proof. It is uniformly coated with coal-tar enamel, and can be welded readily.

Bethlehem Pipe for oil and gas service is made from plate steel, usually to ASTM Specification A-134, A242-50T (Mayari R), or API 5LX. It comes with beveled or straight ends, in sizes from 22 in. i.d., generally in 40-ft lengths.

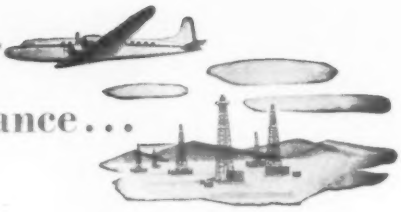
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM OIL AND GAS PIPE

For Sky-High Quality . . .



and Down-to-Earth Performance . . .

BENDIX LOW-TENSION MAGNETOS

CONTROL EXPLOSIVE FUMES with FLAME-PROOF VENTILATION!

The Scintilla Magneto Division of the Bendix Aviation Corporation, foremost producer of low tension ignition systems for the aviation industry, now manufactures this same system to fully meet an important safety requirement of the petroleum industry's engine operations. For example, a special ventilating arrangement permits even air laden with explosive fumes to enter the magneto for ventilation without danger of igniting the surrounding air. Kits are also available to convert magnetos now in use to the "flame-proof" ventilation type.

With the Bendix Low-Tension Magneto, spark plug erosion is reduced to a minimum and variable or fixed ignition can be obtained by internal adjustment. The distribution of low tension voltage to the high tension coils is through a series of breaker assemblies, thus eliminating trouble often experienced with a conventional distributor.

For safety and low operating costs be sure to specify Bendix Low Tension for your magneto requirements. Complete data available on request.

- Low Plug Erosion Rate
- Breaker Type Distributor
- Ventilation without Fire Hazard
- Radio Shielding Available
- Variable or Fixed Ignition

Bendix

SCINTILLA MAGNETO DIVISION OF
SIDNEY, NEW YORK

Bendix AVIATION CORPORATION

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

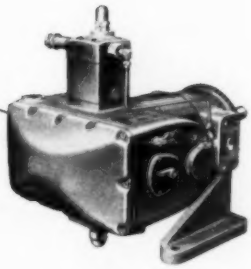
FACTORY BRANCH OFFICES:
117 E. Providencia Avenue, Burbank, California · Stephenson Building, 6560 Cass Avenue, Detroit 2, Michigan
Brouwer Building, 176 W. Wisconsin Avenue, Milwaukee, Wisconsin · 582 Market Street, San Francisco 4, California

See Our Exhibit

OIL SHOW

TULSA MAY 14-23

Booths 29N–30N



DENISON HydrOILic EQUIPMENT

meets the toughest oil-field needs for

RUGGED DEPENDABILITY

"The Finest Money Can Buy!"

DENISON HydrOILics

For more than 25 years, Denison has met Industry's toughest demands for oil-hydraulic equipment – *with the kind of rugged, efficient, high-pressure components that are now winning such wide approval in oil-field operations.*

To meet constantly increasing needs, Denison now offers *today's most rapidly expanding line* of equipment for packaged hydraulic power, hydraulic transmissions, remotely controlled equipment, and other needs for widely adjustable power, speed, and control.

Wherever you need variable speed drives, accurate pressure control, spark-free power transmission, or closely controlled hydraulic motion of any kind, let Denison's HydrOILic Equipment give you the answer.

Write for details, or call your nearest Denison representative.

The DENISON Engineering Company

Factory and Home Offices: 1176 Dublin Road, Columbus 16, Ohio

WEST COAST BRANCH
565 N. Prairie St., Hawthorne, Calif.
Telephone: Osborne 5-3230

CHICAGO BRANCH
4306 W. 63rd St., Chicago 29, Ill.
Telephone: Reliance 5-7474

HOUSTON BRANCH
1200 Bissonet, Houston 5, Texas
Telephone: Justin 6232

When check valves cause frequent round-tripping . . . use Kennametal

Kennametal Sintered Carbide Balls and Seats used in oil well check valving give over 20 times longer service than alloy-steel because they have superior resistance to shock, sand-cutting, corrosion and pitting. Round trips are less frequent —production increases.

Bottom-hole valving efficiency is maintained because of Kennametal's diamond-like hardness. Wear- and corrosion-resistance of this sintered carbide provides unexcelled performance in sand, sour crude, hydrogen sulfides, water, and gas cut fluids.

Many fields are increasing production and lowering maintenance costs by standardizing on Kennametal Balls and Seats. Leading pump manufacturers incorporate them as standard equipment.

Kennametal API Balls and Seats (both flat and rib styles) are stocked and sold by your regular supplier.

KENNAMETAL®

PUTS AN END TO DOWN-THE-HOLE CHECK VALVE TROUBLE

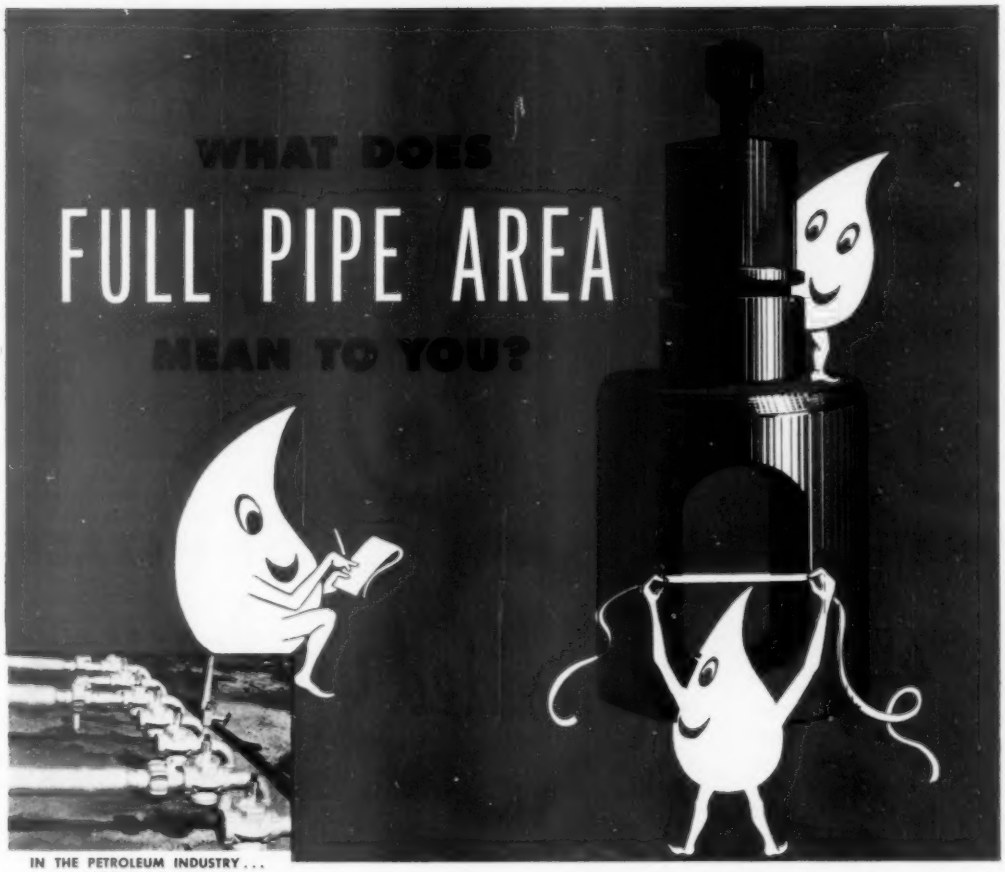
Quality Sintered Carbide API Balls and Seats

Manufactured by

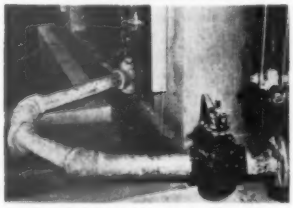
Kennametal Inc., Latrobe, Pa.

SOLD BY YOUR REGULAR SUPPLIER

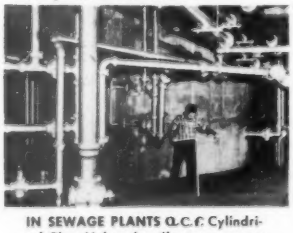
WHAT DOES FULL PIPE AREA MEAN TO YOU?



IN THE PETROLEUM INDUSTRY . . . a.c.f. Cylindrical Plug Valves give full flow, quick quarter-turn shut-off.



ON CHEMICALS viscous heavy ladings or materials in suspension flow freely without turbulence.



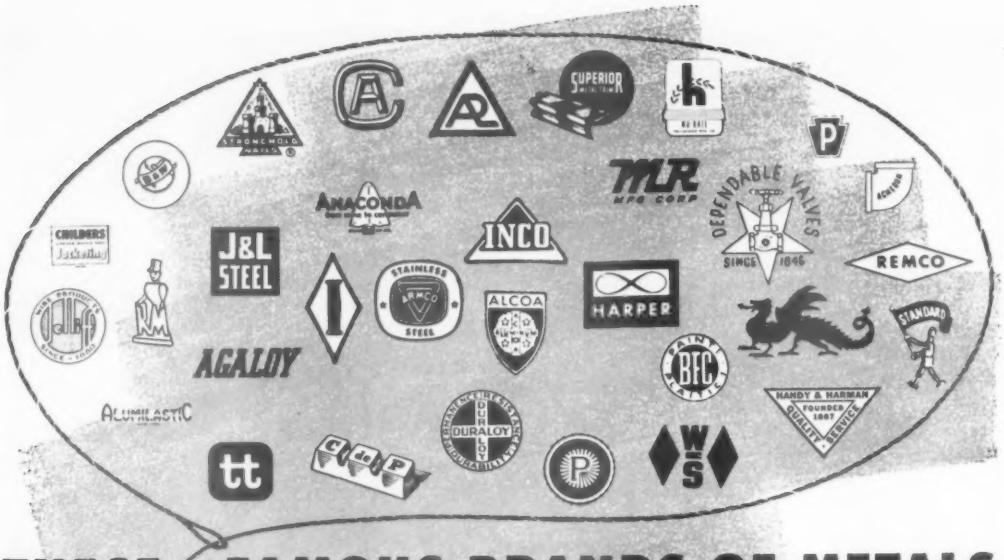
IN SEWAGE PLANTS a.c.f. Cylindrical Plug Valves handle raw sewage with ease—plug shears obstructions.

It means, primarily, a smooth, straight-through flow. Look through an a.c.f. CYLINDRICAL Plug Valve, and you'll see why solids in suspension and heavy, viscous ladings pass so easily. There are no restrictions to retard flow! The valve port has an area at least as large as the pipe itself. For the lowest head loss of any plug valve in the world, specify a.c.f. CYLINDRICAL, Lubricated Plug Valves. You'll save time and pumping cost!

a.c.f. CYLINDRICAL FULL PIPE AREA PLUG VALVES

Write for Catalogue 4-OG, American Car and Foundry Co., Valve Division, 1501 E. Ferry Ave., Detroit 11, Mich.

Representatives in 50 Principal Cities



THESE FAMOUS BRANDS OF METALS

Rounded up for you

Take advantage of this "ONE-SOURCE" SUPPLY

The convenience of "one-source" supply of *all* your metal needs is yours when you deal with Metal Goods Corporation. This time-saving, cost-cutting service from a centralized source of supply means: one call, one requisition, one invoice, and one check. There's no time wasted . . . no duplication of effort! What's more, Metal Goods Corporation adds the benefit of personal, on-the-spot consultation, between its technical men and yours, to the wealth of manufacturing and applicational know-how represented by each of these famous brands. So for quick, complete, comprehensive, and courteous service on *all* metals—aluminum, brass, copper, inconel,* monel,* nickel,* stainless steel and steel—

Please call, wire, or write the Metal Goods Corporation representative nearest you:

OFFICES AND WAREHOUSES

St. Louis 15, Missouri
5239 Brown Avenue
Nelson L. Hower
Phone: GOodfellow 1234

Tulsa 3, Oklahoma
302 North Boston
Scott J. Harrison
Phone: 4-1175

Kansas City 16, Mo.
1300 Burlington
Frank D. Hogan
Phone: NOrclay 3516

Denver 2, Colorado
2425 Walnut Street
Neal Dehn
Phone: AComa 5891

Dallas 9, Texas
6211 Cedar Springs Rd.
Sam D. Hodgdon
Phone: ELmhurst 3271

Houston 3, Texas
711 Milby Street
Harris T. Gregg
Phone: CEntral 8881

New Orleans 12, La.
432 Julia Street
Carl T. Wedemeyer
Phone: CAnal 7373

SALES SERVICE OFFICES

Wichita, Kansas
2200 East Central
Ray Noller
Phone: 7-8921

Jackson, Mississippi
781 Raymond Road
George E. Akerberg
Phone: 5-2711

Baton Rouge, Louisiana
4419 Mimosa Street
Paul P. Vidovic
Phone: 4-4738

Omaha, Nebraska
3515 No. 67th Avenue
C. M. Cooley
Phone: WAlnut 1112

Memphis, Tennessee
713 Columbian Mutual Tower Bldg.
Robert W. Downs
Phone: 5-8721

San Antonio, Texas
2012 Alamo Natl. Bldg.
Robert E. Reese
Phone: GArfield 3161

Davenport, Iowa
924 State Street
Robert L. Tharp
Phone: 2-3156

Decatur, Illinois
1305 West Sunset
Arlie W. Tempel
Phone: 8-1314

Indianapolis 2, Ind.
1333 N. Pennsylvania
Harry L. Newton
Phone: Lincoln 4980

Beaumont, Texas
238 Bowie Bldg.
Lee T. Dodson
Phone: 4-7536, 4-7537

Fort Worth, Texas
3821 Carolyn
John M. Turbitt
Phone: FOrtune 4369

Corpus Christi, Texas
Room 301-02 Wilson Bldg
Roy D. Bagaley
Phone: 4-0366

*Not stocked in St. Louis or Kansas City Territories.

METAL GOODS CORPORATION

GENERAL OFFICES: ST. LOUIS 15, MISSOURI

They Say—

Dollars Lost to Imports

"Loss of tax revenue is only one of the effects of excess oil imports. The reduced state allowables force Texas producers to curtail operations and exploration. This causes unemployment and loss of business by the producers, suppliers, and others dependent on the petroleum industry.

"By thus discouraging wildcatting and the discovery of new fields, heavy imports have the potentially more serious effect of shrinking the volume of available Texas production. Thus the domestic supply might be pinched down to the point where it would be inadequate for defense if war should come. And we cannot depend on foreign oil in wartime.

"This imported oil, produced by cheap foreign labor, enjoys the additional competitive advantage of not being subject to the state production tax. This is a tough and inequitable handicap for our home producers to carry in competing with foreign industry. They should not have to do it."

Editorial in the Houston Post.

We Dropped a Cipher

Sir:

Please refer to your article on Page 177 of the March 23 issue of The Oil and Gas Journal regarding Ganso Azul.

In this article it is stated: "Texas Gulf Producing will have a 6 per cent participation." This should be corrected to read 80 per cent. . . . At the time this information was furnished for this article, Texas Gulf's participation was 60 per cent, but now it is 80 per cent.

Lawrence S. Reed, president
Texas Gulf Producing Co.
Houston.

Editor's note: In one of those pesky typos, the 60 became 6. We're pleased to announce the 60 has since become 80.

Shrimpers and Oil

"The Mexican Navy has seized 13 American shrimp boats off Yucatan. This is the most serious occurrence in a long fishing dispute, but it does have an ironical side.

"Mexico claims sovereignty over waters up to 9 miles off her coast, and has told the shrimp fishermen to stay out. The United States, and the fishermen, have rejected the claim. But many of the fishermen come from Texas and Louisiana. These two states claim rights

an ACCO product

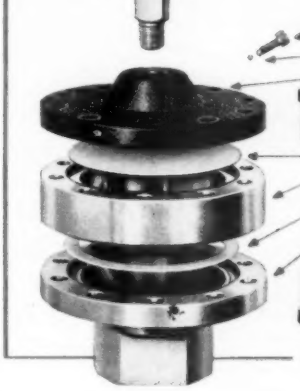
HELICOID Chemical Gage

The gage that retains its original accuracy longer, lasts longer, costs less per gage, per year

• For chemicals and liquids which would corrode or clog the Bourdon tube. Simple, sturdy construction proved in the field.

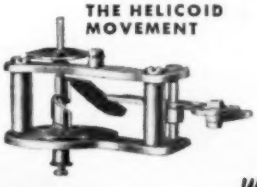
Pressures to 3000 p.s.i., vacuum, or compound; temperatures to 400° F. Diaphragm unit may be ordered separately.

FEATURES



• The Helicoid movement is a simple cam and roller arrangement that gives long, trouble-free service. It has no gear teeth to wear out. Helicoid Gages are made in various sizes and shapes, with black, white, or phosphorescent dials. For wall or stem mounting. Helicoid Gages cost less in the long run.

THE HELICOID MOVEMENT



ACCO

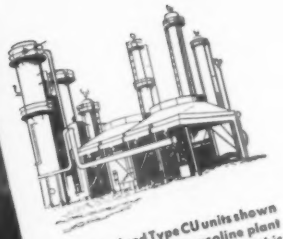
Write today for the Helicoid catalog

HELICOID GAGE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

927 Connecticut Avenue • Bridgeport 2, Connecticut

HELICOID Pressure • Vacuum GAGES



Four Cleveland Type CU units shown here are at work in a gasoline plant in West Texas. Thousands of this compact, heavy-duty vertical drive are in service in the oil fields and throughout American industry.

Hudson selects CLEVELANDS to drive heat exchanger fans

TO drive the fans at a new gasoline plant in West Texas, the Hudson Engineering Corporation selected Cleveland vertical worm gear speed reducers. On this turn-key job, eight CU units were installed to operate gas cooling towers and jacket water coolers to the compressor plant.

The Type CU worm gear drive is designed specifically for cooling tower service. It is a vertical speed reducer built to operate quietly and continuously, at high speeds, for long periods. Extreme conditions of heat and humidity do not affect it. It carries high thrust loads and high radial loads with maximum efficiency. It lends itself to rugged mounting and is easily installed, serviced and adjusted in the field. Every unit is run in and pretested under load before it leaves the factory.

For full description and engineering data, write for Bulletin 135. Free literature for the asking also on other drives in the complete Cleveland line. The Cleveland Worm & Gear Co., 3286 E. 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

to oil deposits up to 10½ and 27 miles off their respective coasts, as against rights of the federal Government.

Still, the shrimp fishermen are probably happy that their case with Mexico will be argued by the Government of the United States, and not by their so extensively sovereign governments in Austin and Baton Rouge."

Editorial in the St. Louis Post-Dispatch.

References Recommended

Sir:

Bell's article, "What Price Spares in a Refinery?" in the March 23 issue is interesting and informative. It would perhaps have been of greater value to your readers if Bell had given the original references for the development of the exponential factor relating equipment costs of various sizes. These references, used by Nelson, are:

"Standardizing Cost Data on Process Equipment," Roger Williams, Jr., Chemical Engineering, June 1947.

" 'Six-Tenths Factor' Aids in Approximating Costs," Roger Williams, Jr., Chemical Engineering, December 1947.

" 'Six-Tenths Factor' Applies to Complete Plant Costs," Cecil H. Chilton, Chemical Engineering, April 1950.

Incidentally, I cannot check the reference given to Nelson's Costimating series of October 5, 1950, in Bell's article (page 247). I believe the Costimating series ended December 29, 1949. The proper reference to Nelson, I believe, should be to Costimating No. 57, November 17, 1949.

Roger Williams, Jr., president
Technical & Economic Services, Inc., New York.

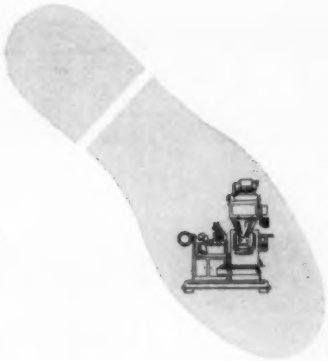
Editor's note: The October 5 reference should have been to page 263. Costimating was dropped in 1949 as a weekly feature, but has been published quarterly since that time.

Hurt Petroleum, Hurt Texas

"The robustness of the Texas economy today is largely due to the petroleum industry. Anything that adversely effects petroleum affects the state. When oil production dropped in 1949, a special session of the legislature had to be called in February, 1950, to raise additional state revenue. That is how dependent state revenues are on petroleum.

"If we tax natural gas to the point where competitive fuels will begin to reclaim the markets, we are not only going to hurt the many thousands of Texans who now get good incomes from the industry, but we are also going to lose state revenues in the long run."

"Our City," column in the Houston Chronicle.



BEMIS GRAVITY PACKER... for fast economical weighing, filling and closing of multiwall paper bags. One- or two-man operation. Speeds—up to 12 bags per minute—either 50-lb. or 100-lb.

Your Three Steps to an Efficient, Economical Petrochemical Packaging Operation

BEMIS MULTIWALL PAPER BAGS... tailored to your requirements. Bemis' twelve multiwall plants are located to give you unexcelled service.

BEMIS PACKAGING SERVICE... for specialized aid in plant layout, installation, etc. Our trained Factory Representatives are at your call for any type of packaging help.

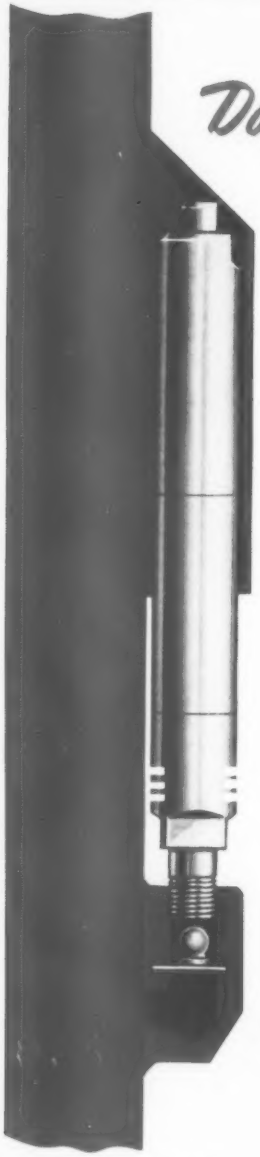
Other Bemis Bags for the Oil Industry... Bemis is a supplier of all types of bags for the oil industry: Wax bags—either cotton-lined burlap or waterproof (laminated-textile) bags—core sample bags, etc.

Bemis

General Offices St. Louis 2, Mo. Sales Offices in Principal Cities

BEMIS BRO. BAG CO.
111 No. 4th St., Box 54, St. Louis 2, Mo.
Send detailed information about Bemis Gravity Packer for use in packing _____ (PRODUCT) ☐;
about Bemis Packaging Service ☐;
about Bemis Bags for _____ (PRODUCT) ☐.
Name _____
Company _____
Address _____
City _____ *Zone* _____ *State* _____

GUIBERSON DOES IT!



Double Duty Type 'A' Flow Valve

With Tungsten Carbide Ball and Seat

produces continuous or intermittent flow with only a surface equipment adjustment

Install Type "A" on any continuous flow operation. When production falls to a level where intermittent flow is required—*a simple surface adjustment* produces well with maximum efficiency and economy. No need to round trip tubing to change valves.

Guiberson Surface Control Equipment...

is designed and built specifically for gas lift. Rugged, weatherproof Type "A" Motor Valve and Time Cycle Controller or Pressure Controller are easy to get to, easy to operate, easy to adjust.

Write today for the new
GUIBERSON GAS LIFT MANUAL

Guiberson Gas Lift Equipment is protected by the following patents

2,136,429 2,227,132 2,271,659 2,340,028 2,361,716
2,160,656 2,230,107 2,292,768 2,347,420 2,377,981
2,165,668 2,305,250 2,356,944 2,411,315

Other patents pending.

THE
GUIBERSON
CORPORATION

ESTABLISHED 1919 • DALLAS, TEXAS, U. S. A.

Sold By Leading Oil Field Supply Stores Everywhere

CALENDAR

APRIL

21 Association of Consulting Chemists and Chemical Engineers, Inc., Hotel Belmont Plaza, New York City, symposium and dinner.

21-23 Southwestern Gas Measurement Short Course University of Oklahoma, Norman.

22-23 Texas Petroleum Research Committee, sixth oil-recovery conference, Texas A. & M. College, College Station.

22-24 American Association of Petroleum Geologists, Rocky Mountain section meeting, Casper, Wyo.

22-24 American Institute of Electrical Engineers, southern district meeting, Hotel Seelbach, Louisville, Ky.

24-25 Interstate Oil Compact Commission, spring meeting, Roosevelt Hotel, New Orleans.

26-29 American Institute of Chemical Engineers, Chemical Institute of Canada, joint meeting, Royal York Hotel, Toronto, Ont.

27-28 Independent Petroleum Association of America, mid-year meeting, Jefferson Hotel, St. Louis.

APRIL 27-MAY 1 American Petroleum Institute, safety and fire protection committees sixth mid-year meeting, Galveston, Tex.

28-30 American Society of Mechanical Engineers, spring meeting, Deshler-Wallick Hotel, Columbus, Ohio.

Apr. 29-May 1 Natural Gasoline Association of America, annual convention, Rice Hotel, Houston.

Apr. 30-May 1 American Gas Association, transmission and storage conference, Edgewater Beach Hotel, Chicago.

MAY

4- 5 American Petroleum Institute, division of marketing, midyear meeting, Baker Hotel, Dallas.

4- 6 Liquefied Petroleum Gas Association, annual convention, Conrad Hilton Hotel, Chicago.

5- 6 Gas hydrate control conference, University of Oklahoma, Norman.

6- 8 American Society of Training Directors, ninth annual conference, Sheraton Plaza Hotel, Boston.

7- 8 American Petroleum Institute, Rocky Mountain district, Division of Production, spring meeting, Gladstone Hotel, Casper.

8 Society of Exploration Geophysicists, Pacific Coast Section, annual spring meeting, Hotel El Tejon, Bakersfield, Calif.

11-13 Southern Gas Association, Jung Hotel, New Orleans.

11-14 American Petroleum Institute, Division of Refining, midyear meeting, New York.

13-14 Pacific Coast Gas Association, annual gas supply and transmission conference, Santa Barbara, Calif.

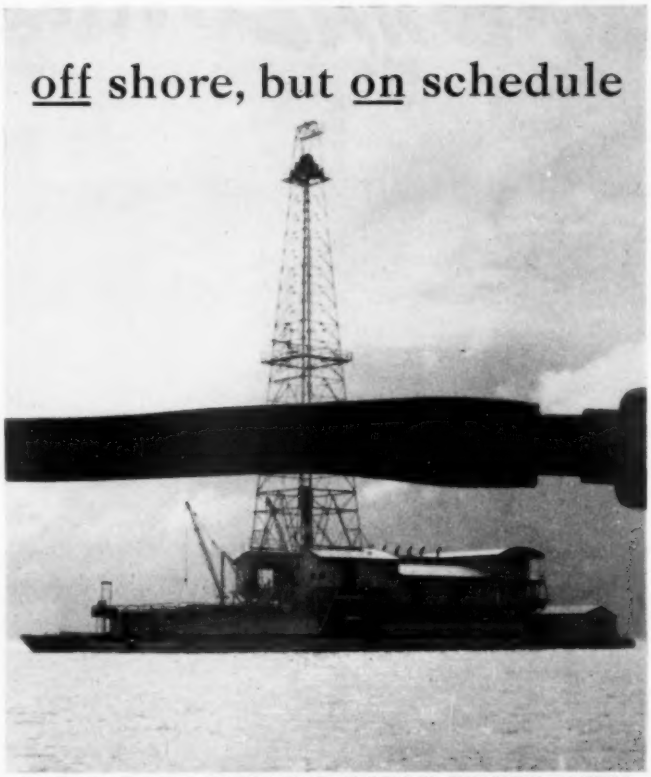
14 Conference on Instrumentation in Water, Sewage, and Industrial Waste Treatment, Manhattan College, New York.

14-23 International Petroleum Exposition, Tulsa.

15-16 International Gas Union, council meeting, Paris, France.

19-22 The Institute of Gas Engineers, ninetieth annual meeting, London, England.

21-23 Panhandle Geological Society, field trip, Yucca Hotel, Raton, N. M.



BLIND PASS DRILLING BARGE EQUIPS WITH

Republic Rubber Hose

Six miles out over salt water is no place for trouble. So Charley Albright, tool pusher for Richardson & Bass Drilling Company, had the job done right. Stem to stern he equipped with tough, dependable Republic Rubber Hose . . . Champion Rotary Drilling Hose with streamlined, boltless couplings, flexible Republic Suction and Discharge Hose and a special Republic Mud Discharge Hose that can be raised at will to eliminate rewelding of pipe when extra blowout preventers are installed. Republic Hose is on the job for Richardson & Bass. Republic Hose should be on the job for you! Get the facts today!!

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS

WEST COAST DISTRIBUTORS
W. C. Hendrie & Company, Inc.
405 Towne Ave., Los Angeles, Calif.

Pacific Coast Rubber Company
51 Main St., San Francisco, Calif.

MID-CONTINENT DISTRIBUTOR
Jones & Laughlin Steel Corporation
Supply Division
P. O. Drawer 2481, Tulsa 2, Okla.

SPECIAL APPLICATIONS FOR.....

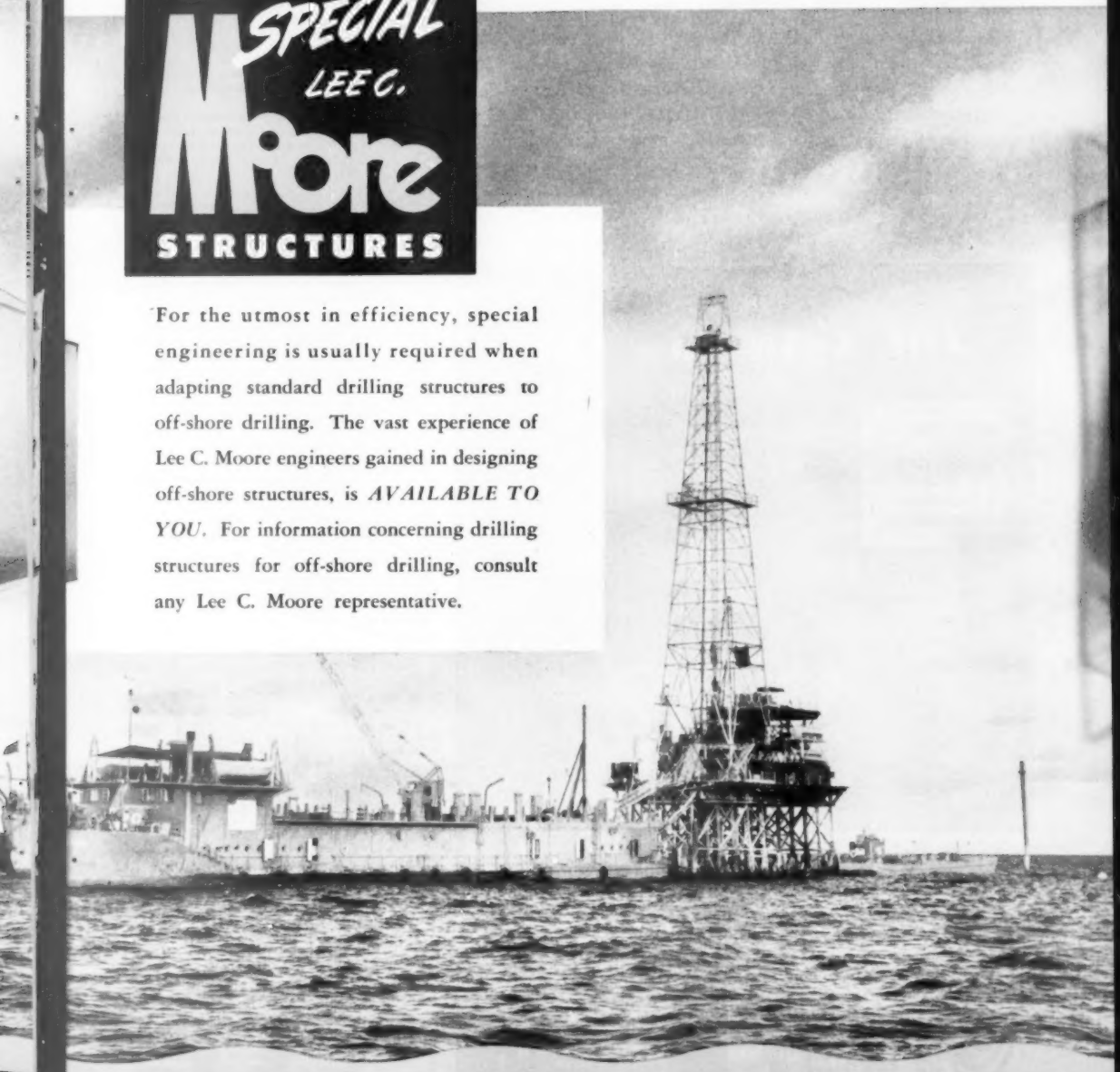
LEE C.

Moore

...EFFICIENT OFF-SHORE DRILLING

SPECIAL LEE C. Moore STRUCTURES

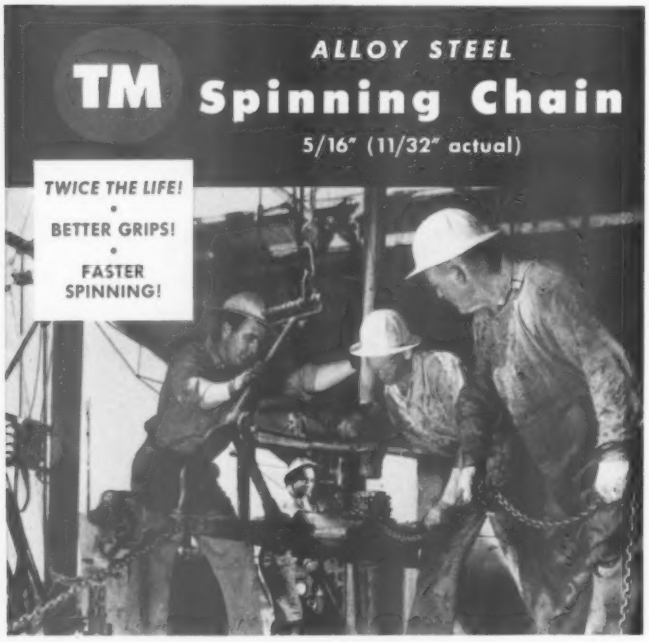
For the utmost in efficiency, special engineering is usually required when adapting standard drilling structures to off-shore drilling. The vast experience of Lee C. Moore engineers gained in designing off-shore structures, is *AVAILABLE TO YOU*. For information concerning drilling structures for off-shore drilling, consult any Lee C. Moore representative.



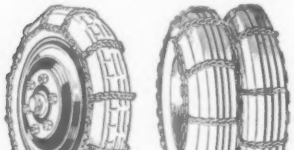
LEE C. MOORE CORPORATION TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT
WICHITA • CENTRALIA • PITTSBURGH • Export Office — Room 624, International Bldg., 630 Fifth Ave., New York 20, N. Y.

DRILLERS ENTHUSIASTIC OVER TM ALLOY STEEL SPINNING CHAIN

TM Alloy Steel Spinning Chain is the answer to driller's demands for a better product on today's deeper holes. This is proved by its widespread popularity throughout the oil fields. Taylor's $\frac{5}{16}$" ($\frac{11}{32}$" actual), special analysis steel and unique chain-making methods assure spinning chain that has greater life—greater strength and greater safety than hi-test types. It's extremely resistant to shock, grain growth, abrasion and cold working at all temperatures. The short, stubby links assure more flexibility and better grips for faster spinning! Taylor also manufactures TM Alloy Steel Boomer Chains. Spinning and Boomer Chains are available in hi-test types as well. Start taking advantage of the savings to be derived from these famous chains right away. Contact your nearest oil well supply store now! S. G. Taylor Chain Company, Hammond, Indiana.



TM Alloy Steel Spinning Chain is stronger—lasts longer than conventional hi-test types. Short, stubby links assure better grips—faster, safer spinning on today's deeper holes!



Taylor manufactures TM Bar-reinforced Tire Chains for passenger cars and truck tires (single, and dual wheel types with triple side chains). Give better traction—longer mileage than regular types.

TAYLOR MADE
A GREAT NAME IN
Chain SINCE 1873

24-27	American Gas Association, production and chemical conference, Hotel New Yorker, New York City.
25-28	Air Pollution Control Association, annual meeting, Lord Baltimore Hotel, Baltimore, Md.
25-29	American Society of Mechanical Engineers, annual conference and exhibit, oil and gas power division, Hotel Schroeder, Milwaukee.
27-29	Texas College of Arts and Industries, Kingsville, eighth annual short course in gas technology.
28-29	Western Petroleum Refiners Association, regional technical-industrial relations meeting, Broadview Hotel, Wichita.
28-29	Natural Gas and Petroleum Association of Canada, London, Ont.
29-30	West Texas Geological Society spring field trip, Paisano Hotel, Marfa, Tex.

JUNE

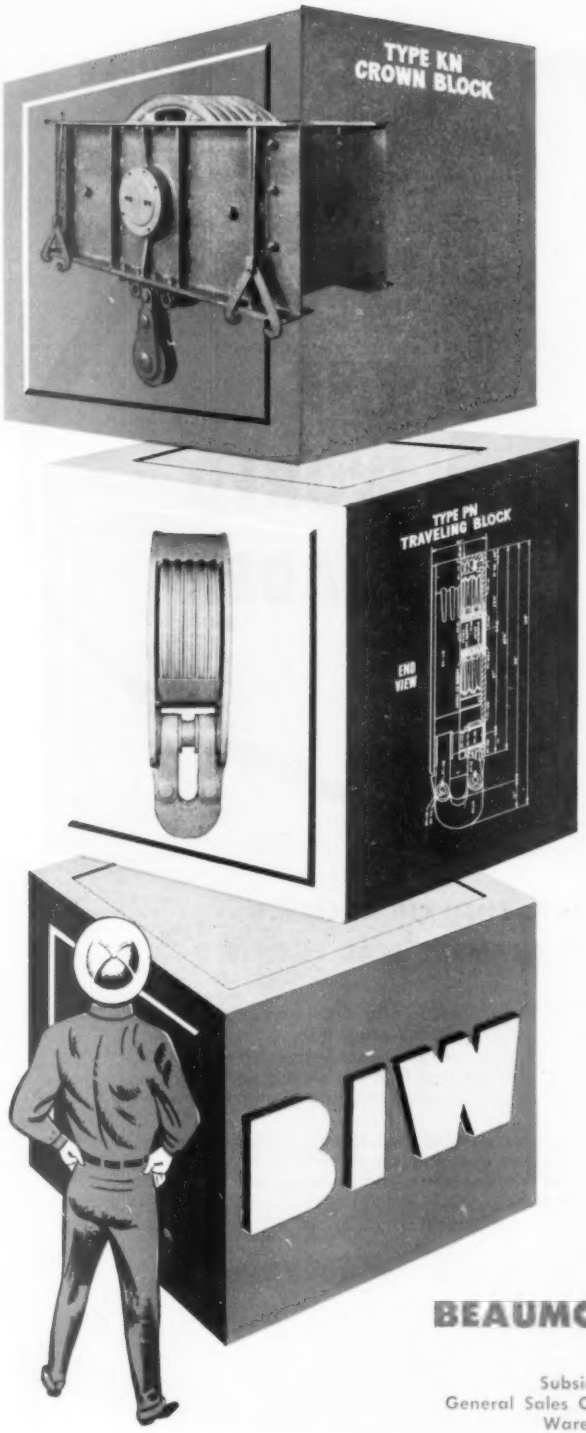
2- 3	American Petroleum Institute, Division of Production, Pacific Coast District, Statler Hotel, Los Angeles.
4- 5	Kentucky Oil and Gas Association, annual meeting, Lafayette Hotel, Lexington, Ky.
7-12	Society of Automotive Engineers, summer meeting, The Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.
14-18	Canadian Gas Association, Windsor Hotel, Montreal, Canada.
15-19	American Association for the Advancement of Science, petroleum conference, Colby Junior College, New London, N. H.
15-19	American Petroleum Institute, Division of Production, midyear committee conference, Hotel William Penn, Pittsburgh.
16-19	American Welding Society, national spring technical meeting, Shamrock Hotel, Houston.
18-19	Western Petroleum Refiners Association, regional technical-industrial relations meeting, Conrad Hilton Hotel, Chicago.
JUNE 16-JULY 2	Intensive Course and Research Conference on Phase Behavior of the Hydrocarbons, University of Michigan, College of Engineering, Ann Arbor.
18-19	Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.
24-27	Intermountain Association of Petroleum Geologists, fourth annual field conference, Ogden, Utah, to Jackson, Wyo.
June 28-July 2	Petroleum Equipment Suppliers Association, annual meeting, Broadmoor Hotel, Colorado Springs, Colo.
JUNE 29-JULY 3	American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

JULY

July 30-Aug. 1	Wyoming Geological Association, eighth annual field conference, University of Wyoming, Laramie.

AUG.

17-19	Society of Automotive Engineers, international West Coast meeting, Georgia Hotel, Vancouver, B. C., Canada.
18-21	American Institute of Electrical Engineers, Vancouver Hotel, Vancouver, B. C.



BIW BLOCKS

BUILD GREATER DRILLING EFFICIENCY!

New, two way bearings on the Type KN Crown Block and the Type PN Traveling Block handle both radial and thrust loads as pure right angle loads. This design increases bearing capacity, reduces weight and cuts space requirements, resulting in longer bearing life, reduced maintenance and lower replacement cost.

The Crown Block can be hoisted through the water table in one piece. Because the center pin is on the center line of the beam, either flange of the beam can be set on the water table beams. The narrow width of the 300 ton capacity Traveling Block permits maximum pipe racking for deep drilling. With its low center of gravity, kicking or side lift is kept to a minimum. Bearings and sheaves are interchangeable between Crown and Traveling blocks.

Write for the complete story on what these blocks can do to cut your drilling costs, increase your drilling efficiency. Beaumont Iron Works, one of the oldest oil country manufacturers, builds a complete line of drilling and producing equipment.

BEAUMONT IRON WORKS CO.

Beaumont, Texas

Subsidiary of American Locomotive Co.
General Sales Office: 1404 Dunlavy St., Houston 19, Texas
Warehouses in Beaumont and Odessa

THE WORLD LEADER

FOR STABILIZING OR REAMING — SECURITY REAMERS *LEAD THE FIELD*

A Security Reamer-Stabilizer in your drill string is your greatest assurance of a clean, straight, full-gauge hole.

Security's 22 years of successful laboratory research and development, combined with practical field engineering and experience, has gained for Security Reamers their leading position in reaming and stabilizing.

Whether it's reamers, rock bits, hole openers or casing scrapers — Security products are geared to the stepped-up requirements of today's intensified drilling efforts, and are being used by operators throughout the world.

Three barrel-shaped cutters contact over one-third wall circumference — acting simultaneously as cutters and as large roller bearings. Unexcelled for reaming, directional drilling, minimizing keyseating, stabilizing, etc. All sizes.

GET Security IN DRILLING

SECURITY ENGINEERING DIVISION
DRESSER OPERATIONS, INC.
MAIN OFFICE: WHITTIER, CALIF.—EXPORT: CHANIN BLDG. N.Y.C.
PLANTS: WHITTIER, CALIF.—DALLAS, TEXAS
BRANCHES IN ALL MAJOR PRODUCING AREAS

ROCK BITS • REAMERS • HOLE OPENERS • CASING SCRAPERS • SECURALOY

THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

Published every Monday by The Petroleum Publishing Co., 211 S. Cheyenne, Tulsa, Oklahoma. Phone 3-6291. Founded in 1902. Name changed to The Oil and Gas Journal in 1910 by Patrick C. Boyle

•

P. C. Lauinger, President; S. H. Rourke, Executive Vice President; Mitchell Tucker, Vice President and Advertising Manager; Hanson B. Pigman, Circulation Manager; Donald W. Wilson, Manager, Industry Census Department; J. Parker Holland, Production Manager.

EDITORIAL STAFF

Kenneth B. Barnes, **Editor;** Henry D. Ralph, **News Editor;** George H. Weber, **Refining Editor,** 500 Fifth Avenue, New York; Dahl M. Duff, **International Editor,** 500 Fifth Avenue, New York; Gerald L. Farrar, **Engineering Editor;** Paul Reed, **Pipe-Line Editor;** W. L. Nelson, **Technical Editor;** Philip C. Ingalls, **Exploration Editor;** C. O. Willson, **Consulting Editor;** R. B. Tuttle, **Equipment Editor.**

Associate Editors: Lynn M. Nichols, Neil Williams, and John C. Casper.

District Editors: TULSA: Ted A. Armstrong, Joseph A. Kornfeld, John C. Reidel, William P. Sterne, Robert J. Enright, and John C. McCaslin. HOUSTON, Sterling Building: F. Lawrence Resen and C. Malcolm Davis. LOS ANGELES, 650 South Grand Avenue: D. H. Stormont. DALLAS, Mercantile Bank Building: Carl F. Hoot. WASHINGTON, D. C., 621 Albee Building: Bertram F. Linz. MIDLAND, TEX., McClintic Building: Roy F. Carlson. CHATHAM, ONT., 35 Stanley: Victor Lauriston.

Editorial Assistants: Carolyn Carter, Tulsa, and Martha Allbright, Tulsa.

Correspondents at Denver, Pittsburgh, Calgary, Columbus, Ashland, Ky., Oil City, Pa., and Mount Pleasant, Mich.

Advertising Offices: TULSA, John D. Reilly, Mid-Continent Manager, and George O. Ruppert, Representative, 211 South Cheyenne, Phone 3-6291; NEW YORK: Charles A. Wardley, **Eastern Manager,** and Robert N. Caird, Jr., Representative, 500 Fifth Avenue, Phone LOngacre, 4-1750; CHICAGO: C. R. Farmer, Manager, Chicago West, and E. S. Klappenbach, Manager, Chicago East, 105 West Madison Street, Phone Central 6-2537; PITTSBURGH: Alfred M. Jones, Manager, 429 Fourth Avenue, Phone Atlantic 1-4835; HOUSTON: John M. Spears, Gulf Coast Manager, Sterling Bldg., Phone CHarter 4626; LOS ANGELES: Donald O. Hanson, Manager, 650 South Grand Avenue, Phone Vandike 0722; ENGLAND: Harry Becker, European Representative, 111 Thorley Lane, Timperley, Cheshire, Phone Ringway 4702

•

Subscription rate to the petroleum industry, United States and foreign, 1 year, $4.00. Single copies, 50 cents. Back copies when over a year old, one dollar. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879. Copyright 1953 by The Petroleum Publishing Co

Member
Audit Bureau of Circulations
Associated Business Papers

JOURNALLY Speaking

King Abdullah's Mines

THIS is going to make domestic producers and royalty owners grind their teeth, but the biggest royalty owner in the world has just had two more bonanzas pitched into his lap.

He is Abdullah as Salim as Subah, who holds down a cushy job as Sheik of Kuwait. Nobody ever heard of Kuwait until oil was discovered there a few years ago, but now the name gives nightmares to producers as far away as West Texas and Wyoming and has come to be almost synonymous with "foreign oil."

Kuwait is a tiny country at the head of the Persian Gulf, wedged in between Iraq and Saudi Arabia. It seems to consist almost entirely of sand on top and oil underneath, for it already has proved reserves half as large as those of the United States and there seems to be no sides or bottom to its oil reservoir.

Kuwait embraces only 1,950 sq. miles, which makes it about the size of an average county in Oklahoma. The country has about 170,000 people, but the only one who owns any of the oil royalty is His Highness Abdullah Salim. In fact, he owns everything in the kingdom. Not only that, but his royalty rate is 50 per cent, which gives him a tidy little income of $150,000,000 per year—and no income tax. Even the fabulous Osage Indians didn't do that well.

Just last month what looks like another big new oil field was discovered in the strip of sand known as the Kuwait Neutral Zone, in which Saudi Arabia has a half interest. Sheik Abdullah will get a one-fourth override on all the oil produced in this area, which ought to help him keep the wolf from his door.

But you ain't heard the half of it yet. Now comes word that a big deposit of diamonds has been found in Kuwait — on the sheik's land, of course—and he is negotiating a concession to develop this side line, also on a 50 per cent royalty. So now Abdullah won't even have to buy his own diamonds. By the Beard of the Prophet, he is favored by Allah. To quote an ancient Arabic proverb: Them as has gets.

But Abdullah Salim is a modest man and an enlightened ruler. Under dynastic law all the income from mineral rights is the sheik's personal income, and he doesn't have to account to anybody for it or share it with anybody. But Abdullah doesn't go in for yachts, racing stables, or fancy trappings, so instead of buying a new Cadillac convertible or a new harem every week he spends his money for public works to benefit his subjects.

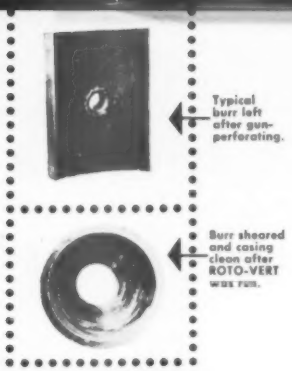
He's replacing dirt roads with asphalt pavements, and mud huts with concrete-block buildings. He's also building free schools and hospitals, and has launched a series of programs to raise the health, educational, and living standards of the pople. Since he can spend about $1,000 per capita per year on such things, the Kuwaitis soon should be the most envied Arabs in all the Middle East.

But Abdullah probably would gladly trade his new diamond mine and even a couple of his oil wells for a fair-sized creek of fresh water. Not a drop of drinkable water, has ever been found in, under, or near Kuwait. All water either has to be distilled from sea water or imported from some foreign country. So even though he is probably the biggest royalty owner is all history, Abdullah has import problems, too.

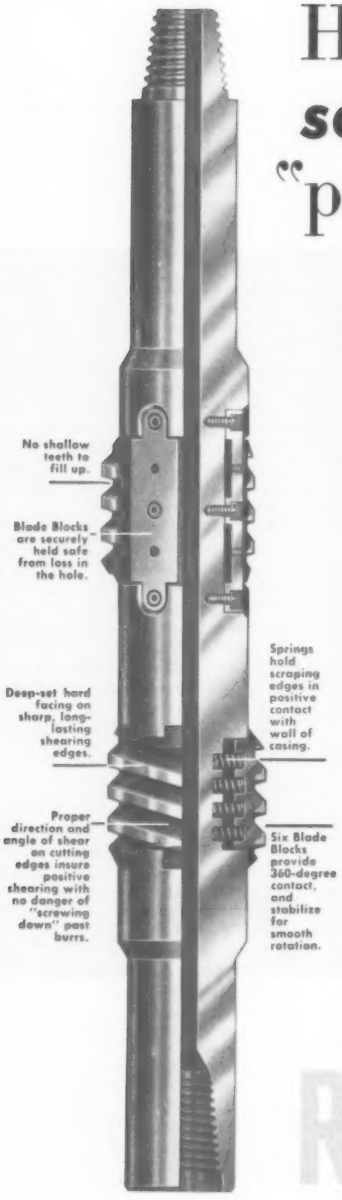
Mud Groceries

PROBABLY to make farmers feel that they are contributing to the oil industry, the Oil Industry Information Committee has put out a leaflet entitled "The Care and Feeding of Oil Wells," which lists some of the items on the "grocery bill" of a mud engineer. It says that to prevent lost circulation the drillers often use large quantities of such things as cottonseed hulls, chicken feathers, flaxseed, sawdust, beet pulp, wheat bran, and even rice and beans. The idea apparently is that if farmers know this they will forgive drilling crews for knocking down their fences and rutting their fields. We have our fingers crossed about this, but if it works we'll say that the O.I.I.C. has earned its pay.

—Henry D. Ralph



Here's why
SCRAPING YOUR CASING
"pays off"


No shallow teeth to fill up.
Blade Blocks are securely held safe from loss in the hole.
Springs hold scraping edges in positive contact with wall of casing.
Deep-set hard facing on sharp, long-lasting shearing edges.
Proper direction and angle of shear on cutting edges insure positive shearing with no danger of "screwing down" past burrs.
Six Blade Blocks provide 360-degree contact, and stabilize for smooth rotation.

Unless the inside of your casing—the vital "working surface"—is clean and smooth, there is always a possibility of trouble in future operations. Burrs from gun-shot perforations, hardened cement or mud, and even mill scale are all dangerous when the time comes to run testers or swabs, or to set retainers or packers of any description.

The Baker Model "C" ROTO-VERT Casing Scraper removes undesirable obstructions from the inside of the casing, leaving it clean and smooth. Burrs or imbedded bullets are sheared away; cement, mud and scale are scraped away, so that any down-hole work can be safely done at once, or during the years to come.

SCRAPE WHILE DRILLING OUT

The ideal time to use the ROTO-VERT Casing Scraper is during the drilling out of cement, at which time it is run as a "follow-up" behind the bit. Thus in a single run you can also remove all hardened cement, mud, burrs and scale which might later damage swabs or testers, and cause packers or retainers to set prematurely—or never set at all.

EASY TO RUN—LOW-COST RENTAL

The Baker ROTO-VERT Casing Scraper is simple to run, and will effectively clean the inside of the casing *when either rotated or reciprocated* (vertical action). No service man is required, and the low rental cost is paid for many times over by freedom from future damage to bailers, swab rubbers and packers, as well as by the elimination of future delays and re-running expense.

BAKER OIL TOOLS, INC.

HOUSTON • LOS ANGELES • NEW YORK

Call Baker for consultation and service . . .

BAKER

ROTOVERT

CASING SCRAPER

PRODUCT NO. 620-C

Let's not ask Washington to solve the imports problem

EVERYBODY in the oil industry agrees that imports are the industry's chief topic of conversation, biggest current concern, and major economic factor.

Almost everybody agrees that imports are necessary, but they should supplement but not supplant domestic production. There has been no public disagreement with the statement that when domestic allowables are substantially below the maximum efficient rate of production it is an indication that imports are supplanting.

The facts are that 5 years ago imports were about 9 per cent of the United States demand, but since then they have increased 100 per cent while domestic production has increased 33 per cent. If imports had been limited to the same rate of growth they would be around 700,000 bbl. per day now. Currently imports are around 1,100,000 bbl. per day, or about 13 per cent of U. S. demand.

IF imports were held to 10 per cent of demand, they would be about 800,000 bbl. per day now, a reduction of 300,000 bbl. daily. During the past 4 months domestic allowables have been reduced by more than 300,000 bbl. per day.

Domestic producers contend that if imports were reduced by 300,000 bbl. per day there could be little complaint either from producers or consumers, and that importers would still have a fair share of our market. That seems reasonable.

But there is no general agreement on means for reducing imports. Almost everyone in the industry professes to prefer voluntary methods, achieved within the industry. But some producers have lost patience, and are seeking a law to limit imports to 10 per cent of domestic demand.

A LAW should be the last resort, and the industry is not yet in such desperate straits. Before that, an attempt should be made to get antitrust clearance for a voluntary, public, flexible agreement among importers, under government observation.

But even that machinery may not be necessary. It is entirely possible that imports can be "talked down" to manageable proportions if the facts and their implications are told often enough and loudly enough. Many people in the industry are doing a good job of this now, but a little more time should be allowed to get results.

Importers would suffer from government intervention and they should be able to judge the temper of the domestic industry. Let's not ask for government help now. Let's try a lot harder to solve this problem within the industry through voluntary, legal, cooperative methods.

You are cordially invited
to a special showing of
"WHAT'S NEW IN CHEMICAL SERVICES FOR THE OIL INDUSTRY"
International Petroleum Exposition
DOWELL BUILDING
- opposite: Cafe de Petrol
DOWELL

Here is your invitation to visit the Dowell Building at the Oil Exposition. We think you'll find it one of the most interesting and informative exhibits at the show.

Here you'll see displays on: Dowell's new fracturing services—Stratafrac, Sandfrac and Fixafrac; the Dowell Electric Pilot unit and how it can save you money; radio-active fluid surveys and photoelectric cell water location; Channeling Acid, Etching Acid, XM Acid; the self-destroying Glass Gun for jet perforation; and Dowell's new and improved oil field products. You'll see a model Selective Acidizing treatment performed right before your eyes.

It will be our distinct pleasure to have you visit us during your stay at the Exposition. Please make a note now: "Don't miss the Dowell exhibit!" We'll expect to see you—at the Dowell Building opposite the Cafe de Petrol . . . at the International Petroleum Exposition, May 14-23 . . . whenever it's convenient for you.

DOWELL SERVICE

Acidizing • Fracturing • Electric Pilot • Perfojet
Paraffin Solvents • Jelflake® • Bulk Inhibited Acid
Chemical Cleaning for Heat Exchange Equipment.

DOWELL INCORPORATED • TULSA 1, OKLAHOMA
A Subsidiary of The Dow Chemical Company

DOWELL

"First in Oilfield Acidizing . . . Since 1932"

THIS WEEK

NEW-TYPE carbon-black plant now undergoing its shakedown run in Pulliam field, near San Angelo, Tex. The plant, designed by Rice Lynn, shown at right, is claimed to cost considerably less than conventional plants and yet obtain a higher-than-normal carbon-black recovery from flare gas. (For design details, see The Oil and Gas Journal, November 24, page 72.)

PRODUCTION.—Gulf Oil Corp.'s 1 Northrup in southeastern Reeves County 20 miles southeast of Pecos, Tex., passed 16,487 ft. last week to set a new drilling-depth record for West Texas. . . . ¶Texas Railroad Commission approves unusual pilot secondary-recovery project calling for conversion of dual oil completion to dual gas injection in Cree-Sykes field of Runnels County, West Texas. . . .

IMPORTS.—Controversy between importing companies and independents and coal producers building up to climax. . . . Jersey Standard and Socony-Vacuum announce reductions in future imports, defend their policies. . . . Independents seek White House hearing to explain their views. . . . House committee prepares to open hearings on Reciprocal Trade Agreements Act, with oil-quota advocates waiting to testify on proposed amendments. . . . Census Bureau report shows imports dropped and exports rose during February. . . . In California Follis says imports in that state will increase during year because of inability to meet military requirements. . . . Local producers, however, will not be affected, he says. . . .

GOVERNMENT.—Department of Justice reveals it will file a civil suit April 21 in District of Columbia Federal Court against the oil companies involved in the "cartel" case. . . . Dismissal of grand jury proceedings to be sought later. . . . ¶Interior Department abandons as unprofitable its demonstration of the production of synthetic gasoline from coal at Louisiana, Mo. . . .

INTERNATIONAL.—Japanese tanker Nissyo Maru loads 126,000-bbl. cargo of Iranian products at Abadon marking a new and more threatening break in the embargo on Iranian oil which developed following nationalization of the industry in that country. . . . ¶Australian Oil Refining, Ltd., a Caltex subsidiary, begins construction work on its new 22,000-bbl.-daily refinery at Kurnell, New South Wales, Australia. . . .

PIPE LINES.—Rancho dedicates 457-mile, 24-in. crude line which will move eventually 345,000 bbl. of West Texas crude daily to Gulf Coast refineries and terminals. . . . ¶FPC on April 30 to begin hearing on application of Colorado Interstate to add 116 miles of line pipe and 22,220 hp. of compressor capacity to its main-line system. . . . ¶Engineers and executives in large numbers turn out to see El Paso Natural's new gas turbines on its Permian basin-to-California line. . . . First use of gas turbines for long-distance gas transmission gives good results. . . .

TRENDS.—Refinery runs averaged 6,705,000 bbl. daily for week ended April 11, a reduction of 260,000 bbl. daily for the week. . . . Runs were at the lowest level since the refinery strike last year. . . . The total drop for the week included reductions of 80,000 bbl. daily for District 1, 68,000 bbl. daily for District 2, and 87,000 bbl. daily for District 3. . . .

ACTIVITY.—Production of crude and lease condensate for the week ended April 11 averaged 6,266,275 bbl. daily, down 72,575 bbl. daily. . . . ¶Total well completions increased 34 wells to 905 for the week. . . . ¶Wildcat completions were up 6 wells to 184 compared with 167 for same week last year. . . . ¶A total of 2,530 rotary rigs were operating in United States on April 13, up 26 for the week. . . .

Imports Showdown

Current events indicate it will come soon; two majors announce reductions, but congressional interest is high

THE industry controversy over oil imports appeared last week to be heading for a climax, spurred by these events:

... **Two large importing** companies announced voluntary reductions in their importing schedules, totaling 25,000 bbl. per day.

... **The House** ways and means committee scheduled hearings beginning April 22 on extension of the Reciprocal Trade Agreements Act, and backers of amendments to impose quotas on oil imports awaited their turn to testify.

... **Importers defended** their position publicly, challenging arguments in favor of congressional action to place limits on foreign crude and heavy fuel oil entering this country.

... **A White House conference** on the imports situation requested by some elements of the oil industry, appeared imminent.

On the eve of its monthly allowables hearing, the Texas Railroad Commission received word that Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc., will reduce their imports during the next few months.

Jersey Standard will cut crude imports by 20,000 bbl. per day during the remainder of this quarter, so that its average imports for the second quarter will be 81,000 bbl. per day instead of the 99,000 estimated earlier. Since the war, Jersey's crude imports have averaged close to 100,000 bbl. per day.

Socony-Vacuum announced a reduction of 5,000 bbl. per day, or approximately 5 per cent, in its imports of crude to the East Coast during the next 4 months.

The situation ... The Reciprocal Trade Agreements Act, under which the administration can negotiate reductions in duties and freeze commodities on the free list, is due to expire this summer. President Eisenhower has asked Congress for a simple extension of 1 year, during which time he has promised a study of the foreign-trade situation.

Many amendments to the act have been introduced in Congress, including a score of bills to impose quota restrictions on imported crude and fuel oil. The Independent Petroleum Association of America has endorsed a proposal to limit petroleum imports to 10 per cent of domestic demand, by quarters.

Coal interests want to limit imports of heavy fuel oil to 5 per cent of demand. The administration is expected to oppose all such limitations as violating the Venezuelan trade agreement and conflicting with its international program.

Residual conflict ... Last week importers began answering attacks on imported oil, particularly residual fuel oil which makes up practically all the imported petroleum products. This heavy fuel, they pointed out, is in a special class, since it is needed to meet industrial requirements on the East Coast where it is in price competition with coal. Domestic yields of this byproduct have declined, and only imported fuel oil can supply this market.

The chief attack on fuel-oil imports is being made by coal interests, though it is getting support from some elements of the oil industry. Importers say that the coal industry's troubles are due chiefly to loss of markets to natural gas, a drop in export demand, and its own price and labor policies, and point out that while coal production dropped 70,000,000 tons in 1952 the increase in residual-oil imports was equivalent on a heat-content basis to only 3,000,000 tons.

A 5 per cent quota would limit imports of residual to 80,000 or 100,000 bbl. per day, and would cut off more than 250,000 bbl. per day from current imports. Practically all of this heavy fuel comes from Venezuela, and such a drastic slash would seriously impair Venezuela's oil industry and her market for American goods.

Moreover, domestic producers are being reminded, if imports of all oils are limited to 10 per cent and heavy fuel oil is limited to 5 per cent, the result will be increased imports of crude oil within the quota.

Oil marketers in the East are vehement against the quota proposals, particularly on fuel oil. The National Oil Jobbers Association accuses domestic producers of trying to create an artificial shortage to increase prices, and it threatens to fight for elimination of the producers' depletion allowance for tax purposes if import restrictions are imposed.

Crude-oil case ... Not nearly so strong a case is being made against imports of crude oil, though importers say the increase in the past year or so has not been as serious as domestic producers indicate.

Some of the increase has gone to the West Coast, where California light crude has been insufficient to meet demands. The reduction in production in other parts of the country has been due only partially to imports, other factors being rising production of natural gasoline and other light products, the necessity for reducing the level of oil stocks, and the slower gain in domestic demand.

Last year imports averaged about 958,000 bbl. per day, of which 573,000 bbl. per day was crude. About 32,000 bbl. per day of this crude went to the West Coast. Forecasts early this year indicated 1953 imports at about 1,025,000 bbl. daily, with all of the increase being in crude oil.

Most of this crude oil is refined on the East Coast, and in 1952 the ratio of foreign to domestic crude refined in East Coast refineries returned to the same figure that existed in 1950 before much Middle East crude was diverted to the Eastern Hemisphere to replace the Iranian loss. The ratio of foreign to domestic crude refined on the East Coast was 29 per cent in 1947, 35 per cent in 1948, 43 per cent in 1949, 46 per cent in 1950, 42 per cent in 1951, and 46 per cent in 1952.

Independents' hopes ... President Eisenhower has been asked to give personal consideration to the matter of imports, and independent producers and refiners are confident that a White House conference will be arranged in the near future.

They do not look to such a meeting to develop a plan for voluntary action, but rather as giving the administration a clearer understanding of the problem and a reason to support the domestic industry's attempts to reduce imports.

The independents contend that the question of imports has gone beyond a merely economic problem and has become definitely a question of national defense. The administration's expansion program for the oil industry, they will tell the President and Congress if they get the chance, cannot be assured if it is to be pressed in the face of steadily increasing imports and continuous cutbacks in production allowables.

Suggestions for voluntary reductions by importing companies are discounted by many domestic producers. There might be antitrust complications if

they agreed among themselves without government sanction. In addition, they are not entirely free agents in that delicate relationships with foreign governments are involved and because operating schedules are laid down months in advance.

Therefore many domestic producers insist on some governmental action, believing that, with the best intentions in the world, the companies could not make any significant reductions in their imports without running into trouble abroad.

NPA Program Varied

Attitude of new administration, shifts in methods of oil movement, trends in automobile-engine design discussed

George Weber

CLEVELAND.—Government, transportation, imports, and the future in fuels and lubricants were among the diverse topics considered at the fiftieth semiannual meeting of the National Petroleum Association last week.

A feeling of confidence in the new administration in Washington was voiced at the meeting. Association President A. W. Scott, president of Wolf's Head Oil Refining Co., Inc., said the new recognition being given business presents both an opportunity and a challenge. We all have a distinct obligation to conduct our affairs in such a way that privately owned business will continue to merit the confidence that the public has placed in it, he said.

Scott publicly praised the Petroleum Administration for Defense for fair-minded allocation of materials by men intimately acquainted with the industry's problems. He did, however, raise a question regarding PAD's program for lubricating-oil capacity in this country.

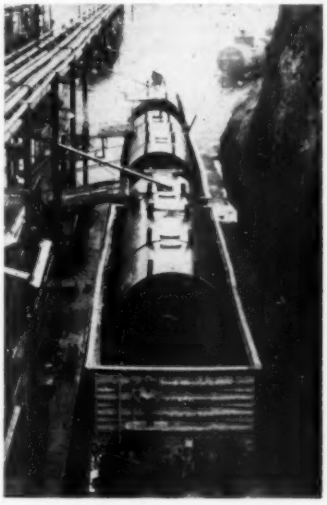
Lube program questioned . . . "I must say that I was somewhat startled by the recent announcement of PAD that we need a further expansion in lubricating-oil-manufacturing capacity," he said. "According to PAD's figures, we had a capacity for producing 178,000 bbl. a day of finished lubricating oils on January 1, 1952. PAD has set a goal for lubricating-oil expansion that calls for the addition to domestic facilities of capacity to produce 28,000 bbl. a day by the end of 1955.

"Thus, even if we assume that capacity totaling 12,000 bbl. a day will be retired, we would still have a capacity of 194,000 bbl. a day. PAD estimates that the demand for lubricating oils will average about 153,000 bbl. a day for the next 3 years, and this estimate assumes a substantial increase in domestic demand to compensate for our rapidly disappearing export market. This represents an excess of capacity over demand of 26 per cent or approximately twice the excess which we will have for the production of other petroleum products."

Transport study . . . The projection of a study of petroleum transportation, to include data for 1951, was presented by John E. Boice of PAD. His calculations showed that for every barrel of refined products consumed in this country, transportation must be provided for at least 2½ bbl. of crude and finished products.

Of the 2,372 million barrels of crude moved to refineries in 1951, pipe lines delivered 74 per cent, water carriers, including tankers in the import trade, 24½ per cent, and tank cars and trucks combined, only 1½ per cent. During the same year, water carriers handled 43.5 per cent of all refined products, trucks moved 32.8 per cent, pipe lines 13.7 per cent and tank cars, 10 per cent.

In the future, said Boice, pipe lines will handle even greater percentages of products. Line deliveries now exceed 1,500,000 bbl. per day as compared with only 592,000 bbl. per day in 1946. The railroads stand to lose ground still further if the present trend toward handling more L.P.G. in pipe lines continues, although they may be expected to retain much of the traffic in heavier products which do not move by pipe line.



New Asphalt Container

Union Oil Co. now is using these new 3,000-gal. containers for long-distance transportation of asphalt from its Oleum refinery in California. They are reported to cut costs by eliminating packaging and handling of large quantities of the product in smaller containers. An advantage over the tankcar is that the container can be lifted by a crane from a railway gondola to the hold of a ship, deck of a barge, or other type of transport. Each container is equipped with steam coils to reheat heavy asphalt for unloading. The containers are supplied by Transit Tank Co., San Francisco.

River transportation up . . . With increasing competition and increasing costs every oil company aims to reduce transportation costs, said M. C. Dupree, transportation manager for Ashland Oil & Refining Co. Ashland is a pioneer in river transport of both crude and products and about 90 per cent of the 60,000 bbl. per day processed in their Catlettsburg and Louisville refineries was transported by barge from the crude-producing areas of the Midwest and Gulf Coast.

In the past year Ashland's fleet of towboats and barges moved over 2 billion tons-miles of oil products on rivers, compared with 1 billion tonmiles in 1949 and 640 million tonmiles in 1944. The industry as a whole used the inland waterway system to move 17.9 per cent of total petroleum traffic or 2,465,000 bbl. per day in 1950 as compared with 13.2 per cent or 975,000 bbl. per day in 1940. This represents a 150 per cent increase.

The capital investment required to barge crude from the Gulf Coast to Ashland's two Kentucky refineries is roughly 30 per cent of the cost of a pipe line, said Dupree.

Ashland's two newest towboats, powered by three 1,600-hp. diesel engines, will push a fleet of barges with a capacity half again as large as a T-2 tanker and nearly as great as that of the new supertankers. They can complete a round trip from Ashland to the Gulf Coast below New Orleans, a distance of 3,200 miles, in 20 days, and their upstream speed compares favorably with the speed of products moving in a pipe line.

New engine trends . . . H. L. Welch, of Chrysler Corp., discussed what he called an "engine renaissance" now under way in the automotive industry. From a study of combustion-chamber design, Chrysler determined that the

difference in efficiency between various types of combustion chambers was greater than significant variations in compression ratio.

Comparative tests on single-cylinder engines showed the following equivalent increases in compression ratio over Chrysler's hemispherical combustion chamber at a compression ratio of 7.0 to 1: F head 10.7 to 1 at 800 r.p.m. and 8.2 to 1 at 3,600 r.p.m.'s; L head 10.2 to 1 at 800 r.p.m. and 8.5 to 1 at 3,600 r.p.m.'s; conventional overhead valve 8.7 to 1 at 800 r.p.m. and 7.8 to 1 at 3,600 r.p.m.

The possible gains from higher compression ratio on the new engine design are well known, said Welch. Tests at compression ratios as high as 12.6 to 1 have shown that the already high efficiency at a compression ratio of 7.5 to 1 increased in exact harmony with theoretical air-cycle calculations throughout the range tested. Future gains from compression ratio increase can therefore be expected, he said, as rapidly as fuel antiknock quality makes it practical.

New Policy Needed

Government help essential to assure adequate standby capacity for defense without oversupply, N.P.A. told

CLEVELAND.—Something new must be added to our antitrust laws and our foreign policy to permit the industry to cooperate fully in the current program for providing standby capacity for defense.

This view was expressed last week by P. C. Spencer, president of Sinclair Oil Corp., before the fiftieth semiannual meeting of the National Petroleum Association.

In regard to the program of the Petroleum Administration for Defense, Spencer said the industry has, without government compulsion or subsidies, developed a crude-oil-producing capacity of about 1,000,000 bbl. per day and refining capacity estimated at 800,000 bbl. per day in excess of normal market requirements.

To provide a petroleum safety margin of not more than 20 per cent, "We would need an excess productive capacity of about 1,500,000 bbl. daily. It is pertinent to inquire at this point how we are to provide the billions of capital as well as the billions for interest, depreciation, and maintenance charges required for wells and facilities which do not produce except on a wartime basis.

"Certainly the industry could not long carry any such burden under existing price, cost, and tax conditions," Spencer said. "If present excess facilities overhanging the market were to be increased without regard to market stability, the situation would be grave indeed. We could expect ruinous prices not only for refined products but for crude oil as well," he warned.

Spencer offered no pat solutions to the excess capacity problem but did suggest that further industry cooperation should be possible if the government would redefine certain rules of the game. Plans for the creation and maintenance of substantial reserve petroleum capacities are doomed to failure at the start unless supported by the wholehearted cooperation of industry, plus the wisdom on the part of industry to exercise what is being described currently in many quarters as "industrial statesmanship."

What is needed . . . In pledging full cooperation and support to the national defense program, Spencer feels that the industry should seek to obtain two definite things from the government:

1. A revision and restatement of our antitrust laws, geared to modern-day realities for both government and business.

2. A revision and restatement of our foreign policy with respect to the oil activities of its nationals in foreign lands, particularly in the Western Hemisphere where the economic and military security of our neighbors is so closely tied to our own.

"To deal with these problems promptly and effectively, we must be able to act within proper areas on an industry basis, and this it is not now safe to do because of confusion, uncertainty, contradictions, and stymies developed under our antiquated antitrust laws and conflicting interpretations and regulations," he said.

Regarding imports . . . On the matter of imports, Spencer said there should be general acceptance of the proposition that in any program to provide for our own security, we must consider the strategic importance of friendly oil-producing countries—especially those in the relatively safe areas of the Western Hemisphere. We cannot close our markets to them in peacetime if we expect to count on them in wartime, he said, adding that it was impractical to supply necessary margins of military security by turning them off and on at will.

"I am not attempting to write the rules," Spencer said, "but I am convinced that given a clear and adequate set of rules to work by, both at home and abroad, there is the readiness, the willingness, and the ability within the industry to do the job of providing both petroleum guns and petroleum butter in ample supply in times of peace or war notwithstanding the many intricate and challenging obstacles to be overcome."

Imports Drop

Total February shipments off 80,000 bbl. per day

IMPORTS decreased and exports increased in February, according to data compiled by the Census Bureau of the Department of Commerce.

Total imports into continental United States averaged 1,065,000 bbl. daily in February, down 80,000 bbl. daily from January but up 130,000 bbl. daily from the average for February 1952.

Crude imports decreased 42,000 bbl. daily in February to 582,000 bbl. daily. Most of the decrease came through reduced receipts from Venezuela and Saudi Arabia. Crude from Venezuela was down 23,600 bbl. daily, and re-

IMPORTS INTO CONTINENTAL UNITED STATES

(Thousands of barrels)

	Feb. 1953	Jan. 1953	Feb. 1952
Crude—			
Mexico	558	509	775
Colombia	1,533	1,350	1,094
Venezuela	8,735	10,404	8,621
Kuwait	2,287	2,704	1,650
Saudi Arabia	2,318	3,247	1,723
Iraq	187	186	
Canada	92	172	111
Far East	582	789	109
Total crude	16,292	19,361	14,083
Daily average	582	624	486
Products—			
Residual fuel	12,642	15,548	11,861
Other products	884	601	1,177
Total products	13,526	16,149	13,038
Daily average	483	521	449
Total all oils	29,818	35,510	27,121
Daily average	1,065	1,145	935

EXPORTS*

	Feb. 1953	Jan. 1953	Feb. 1952
Crude	2,011	2,211	2,211
Gasoline	2,339	2,645	2,132
Kerosine	376	324	216
Distillate fuel	3,648	2,117	1,642
Residual fuel	1,339	1,367	1,847
Lube oils	643	902	1,379
Other products	883	919	902
Total all oils	11,239	10,485	10,329
Daily average	401	338	356

*Excludes shipments to territories.

CRUDE IMPORTS BY GRADE
(Thousands of barrels)

	Under 25 gravity	Over 25 gravity
Mexico	424	134
Colombia	815	718
Venezuela	1,173	7,562
Kuwait	.....	2,287
Saudi Arabia	.....	2,318
Iraq	.....	187
Canada	.....	92
Far East	.....	582
Total February 1953	2,412	13,880
Total January 1953	3,378	15,983

ceipts from Saudi Arabia dropped 22,000 bbl. daily.

Only 14.8 per cent of the imported crude was 25° gravity or under, and almost half of the heavy crude came from Venezuela. The small table shows a breakdown of crude by countries, separated into the two grades.

Exports . . . Exports of crude and products, excluding shipments to territories, averaged 401,000 bbl. daily in February compared with 338,000 bbl. daily in January and 356,000 bbl. daily in February last year.

Almost all of the increase in exports was due to larger shipments of distillate fuels. Distillate exports had been abnormally low in January, averaging only 68,300 bbl. daily. The February average of 130,300 bbl. daily represented a gain of 62,000 bbl. daily over January and was the highest rate since the end of the war.

Lube-oil exports averaged only 23,000 bbl. daily, down 6,100 bbl. daily from January. The average for February was less than half the average for February last year.

Compact Membership Sought

OKLAHOMA CITY. — The Alaska Legislature has approved a measure applying for acceptance of the territory as an associate member of the Interstate Oil Compact Commission, and the application has been signed by the governor of Alaska, Earl Foster, I.O.C.C. executive secretary said last week.

Total membership of the Compact now stands at 22 member and four associate member states. North Dakota and Nebraska are the Compact's newest regular-member states, both having affiliated since the first of the year. Alaska's action follows closely the affiliation of Nevada as an associate member.

Big Gas Outlay Seen

FPC's Smith predicts industry will spend $5 billion for expansion from 1952-56—$3 billion of it for transmission

F. Lawrence Resen

HOUSTON.—The natural-gas industry will spend more than $5 billion for expansion during the 5 years from 1952 to 1956 inclusive and nearly $3 billion of this amount will go into transmission facilities, according to Nelson Lee Smith, of the Federal Power Commission.

Speaking at the recent meeting of the Petroleum Industry Electrical Association here, Smith said the accelerated expansion pace can be visualized by comparing construction in 1943, when only 51 miles of pipe lines were laid and 3,560 hp. in compression installed, with 1952, when FPC approved construction of 4,147 miles of lines and the installation of 588,000 hp. in compressors.

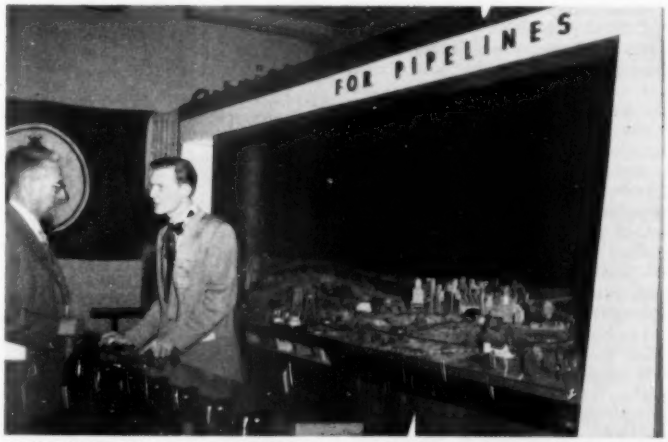
Cost of the two groups of projects were estimated at $1.6 million in 1943 and more than $400 million in 1952.

Since fiscal 1943, when FPC first began issuing certificates of public convenience and necessity, Smith said, the agency approved construction of nearly 48,000 miles of pipe lines and more than 3,400,000 hp. in compressor units as of January 1, 1953.

These facilities cost an estimated $3,337 million and add more than 18 billion cubic feet of gas to the nation's daily delivery capacity.

Reserves decimation . . . Turning to reserves, Smith said the picture shows that production is swallowing up gains in reserves. At the beginning of 1938, the year when the Natural Gas Act became effective, the nation's gas supply had an indicated remaining life of 22 years, with total reserves estimated at 66 trillion cubic feet. By 1946, these estimates had risen to an indicated life of 32.5 years, with proved recoverable reserves of about 160 trillion cubic feet. On January 1, 1952, the nation's proved recoverable reserves were estimated at 193.8 trillion cubic feet, which represented an increase of 8.3 trillion cubic feet over the estimate of a year earlier. However, with the 1951 rate of net production estimated at 7.9 trillion cubic feet, the indicated life of known recoverable reserves at the end of that year was only 24.5 years—as compared with 27 years at the beginning of the year. Therefore, Smith said, we are presented with a situation wherein discoveries have continued to mount at a heartening rate, while production, rising at an even greater pace, has more than erased the gains, in terms of years supply.

The diminishing ratio of reserves to production has been accompanied by a growing problem of deliverability. The drop in pressures brought on by the continued drain on the older fields, difficulties in production from deeper horizons, and in certain cases the impact of conservation measures relating to oil or gas production, all have some effect on the rate at which gas can be withdrawn from the producing fields. This means that, while total reserves may be mathematically adequate to support a given rate of production for a particular number of years, these



APPLICATION OF COMMUNICATIONS in the pipe-line industry was demonstrated at the recent Petroleum Industry Electric Association meeting in Houston by Bell Telephone Co. with this model of two cities and their industrial locations. Telephones were used by viewers to converse with the attendant, eliminating the distraction of loudspeaking systems.

other factors may come into operation to considerably shorten the predicted life span, Smith said.

Smith expressed optimism about prospects of additional discoveries and the future of the industry but made it clear that the foregoing factors demonstrate the necessity of wise utilization of known natural-gas reserves and avoidance of waste in the production and use of this great resource. He said they also emphasize the desirability of encouraging the discovery, development, and dedication of natural gas to useful public service.

Product Stocks Drop

But first-of-March figure still higher than in 1952

SECONDARY stocks of the four major products totaled 47,993,000 bbl. on February 28, for a decrease of 5,783,000 bbl. during the month. However, stocks at the end of the month were about 1,100,000 bbl. greater than at the same time last year, according to figures released by the Census Bureau of the Department of Commerce.

Total stocks at the end of February filled about 53 per cent of total secondary storage capacity estimated for January 31, 1953.

The decrease during the month of February included reductions for each of the major products but with the major portion of the drop reported for distillate fuel. Distillate stocks were off 3,158,000 bbl. with most of the reduction in District 1. Residual stocks were down 1,189,000 bbl.

In the period from July 31, 1952, through February 28, 1953, very little seasonal change was indicated for gasoline stocks in secondary storage. Highest gasoline stocks were reported for the end of July, but the total at the end of January was only about 100,000 bbl. less.

The reports for the period do indicate that secondary stocks of distillate fuels follow the normal seasonal for primary stocks. Secondary distillate inventories were reported at 17,463,000 bbl. at the end of last July and had climbed to 22,671,000 bbl. by the end of September. Heating-season reductions cut the total to 19,283,000 bbl. at the end of January.

The large reduction in secondary distillate stocks during February shows the influence of higher-than-normal primary inventories. With an excellent outlook for plenty of distillate for the remainder of the heating season, secondary suppliers reduced their investments in inventories and cut down the possibility of having surplus distillate in secondary storage at the end of the heating season.

Kerosine stocks followed the same general pattern set by distillate but with slightly larger percentage reductions in the late months of 1952.

Residual inventories were reduced 2,104,000 bbl. between the end of September and February 28.

SECONDARY STOCKS
(Thousands of barrels)

	Feb. 28, 1953	Jan. 31, 1953	Dec. 31, 1952
Gasoline:			
Dist. 1	5,622	5,788	5,341
Dist. 2	8,692	9,068	8,104
Dist. 3	3,185	3,093	3,194
Dist. 4	918	902	863
Dist. 5	1,885	2,137	2,012
Total	20,302	20,988	19,514
Kerosine:			
Dist. 1	2,394	2,854	2,890
Dist. 2	3,075	3,342	3,458
Dist. 3	771	785	780
Dist. 4	93	99	98
Dist. 5	98	101	107
Total	6,431	7,181	7,333
Distillate:			
Dist. 1	7,775	10,092	10,062
Dist. 2	5,750	6,523	6,494
Dist. 3	1,029	1,033	914
Dist. 4	476	523	483
Dist. 5	1,095	1,112	1,150
Total	16,125	19,283	19,103
Residual:			
Dist. 1	3,246	4,168	4,044
Dist. 2	1,334	1,646	1,773
Dist. 3	399	304	300
Dist. 4	5	6	6
Dist. 5	151	200	160
Total	5,135	6,324	6,283
Major products:			
Dist. 1	19,037	22,902	22,337
Dist. 2	18,851	20,579	19,829
Dist. 3	5,384	5,215	5,188
Dist. 4	1,492	1,530	1,450
Dist. 5	3,229	3,550	3,429
Total	47,993	53,776	52,233

TRENDS IN SECONDARY STOCKS
(Millions of barrels)

1952—	Gaso.	Kero.	Dist.	Resid.
July 31	21.1	7.7	17.5	7.2
Aug. 31	20.2	8.0	20.6	7.0
Sept. 30	20.1	8.3	22.7	7.2
Oct. 31	20.4	8.3	22.2	6.7
Nov. 30	19.9	8.0	21.5	6.5
Dec. 31	19.5	7.3	19.1	6.3
1953—				
Jan. 31	21.0	7.2	19.3	6.3
Feb. 28	20.3	6.4	16.1	5.1

CANADA

New Company Formed

CALGARY, Alta.—Shareholders of four western oil companies have approved a merger of the companies into a new firm, Rio-Prado Consolidated Oils.

The four companies are Rio Tinto Alberta Oils, Prado Oil & Gas Co., Punch Petroleum, and Triumph Oil Corp. The merger was made to obtain stronger administration and financial structure, in view of the several exploratory - developmental ventures in which the four companies are participating.

Under the merger plan, Rio Tinto shareholders will receive five shares of the new company for every four shares of Rio Tinto. Prado shareholders will receive three for four, Punch one for three, and Triumph 9 for 20.

The new company will have an authorized capital of 8,000,000 common shares. Assets of the four merging companies were valued at $13,772,934 as of January 16.

Petroleum Plant Opened

MONTREAL. — Shell Oil Co. of Canada's $4,000,000 petrochemical plant was officially opened last week at Montreal. It has a capacity of 1,500,000 gal. of isopropyl alcohol and 1,000,000 gal. of acetone a year and is the first such plant in Canada designed to produce these chemicals.

The official opening ceremony was performed by Mrs. Louis St. Laurent, wife of Canada's prime minister.

ROCKY MOUNTAIN

Williston Outlay Forecast

MINNEAPOLIS.—Development of the Williston basin this year will require an expenditure of about $100,000,000, according to Frank O. Prior, executive vice president of Standard Oil Co. (Ind.).

Addressing the annual dinner of the Minneapolis Chamber of Commerce, Prior said the basin is "on the threshold of its development" and said Indiana Standard is so confident in its possibilities that it holds leases on 4,500,000 acres.

"Compared to the value of the oil taken from the ground in 1952—the first full year of production — $3,400,000," Prior said, the $100,000,000 expected to be spent this year "is a staggering sum."

The basin now has 183 completed oil wells producing about 20,000 bbl. per day, and 68 new wells are now being drilled, he said. Prior pointed out that 200 dry holes were drilled before the Williston basin's discovery was drilled and said 143 dry holes have been drilled in the last 2 years.

Viscosity Analyzer

New instrument, using ultra-high-frequency sound waves, shows promise as control for oil's continuous operations

George Weber

NEW YORK. — Another promising instrument for process control, the "Ultra-Viscoson," has been added to the growing list of developments heralding the "Analyzer Age" in petroleum refining.

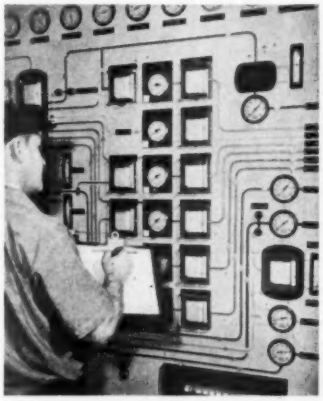
Employing ultrahigh-frequency sound waves, this instrument provides an instantaneous and continuous measurement of viscosity of a product stream. It shows potential promise as a control for fractionation, lubricating-oil manufacture, product blending, pipeline transportation, and other continuous operations in the petroleum industry.

The Ultra-Viscoson was developed and manufactured in limited quantity by the Rich-Roth Laboratories of Hartford, Conn. Recently, Bendix Aviation Corp. acquired the instrument, and volume production will start at once, according to Lawrence A. Hyland, Bendix vice president in charge of engineering.

How it works . . . Containing no moving parts, the instrument consists of a small sensing element or probe, which is immersed in the liquid under test, and an electronic computer. The probe is designed for permanent installation in a flow line, tower, or vessel. A thin alloy-steel blade in the end of the probe is excited by ultrasonic energy equivalent to only one-millionth the power of an average flashlight. The rate of ultrahigh-frequency vibration of the blade is determined by the viscosity of the fluid being tested. Measuring this vibration rate, the computer actuates a continuous recorder, giving a continuous reading on the viscosity of the fluid surrounding the probe.

The instrument can operate over a wide range of pressure and in vacuum. Temperature limits of the fluid being measured range from —200° F. to 650° F. This versatility provides a means of measurement where none was possible previously, Hyland said. The device can be supplied with explosionproof fittings for use in highly explosive atmospheres.

Its application in the petroleum field lies principally in the continuous measurement and, ultimately, the control of viscosity in fractionator side streams and automatic-blending operations. It should prove useful in tagging the interface in crude or product pipe lines and measuring the degree of admixture of two fluids throughout the interface. It also has potential applications in the measurement and control of solvent refining, solvent dewaxing, and other lube-oil-manufacturing operations.



SECTION OF CONTROL BOARD of first commercial installation of Ultra-Viscoson at Sun Oil Co.'s Marcus Hook, Pa., refinery.

First use in refining . . . The first commercial application of the instrument in refining has been by Sun Oil Co. at its Marcus Hook, Pa., refinery. Ultra-Viscoson probe units have been installed in six side streams on a vacuum-distillation column employed in separating lubricating-oil cuts. The accompanying picture shows a section of the control board on this unit.

The six streams consist of raw stocks for manufacture of transformer oil, and lube oils of 100, 150, 200, 500, and 2,000 Saybolt viscosities. The vertical bank of dial instruments measure quantity, and the recorders to the left show tray temperature. The recorders on the right are actuated by the Ultra-Viscoson computers in each stream, and give direct readings in absolute viscosity in centipoises. Since the viscosity measurements are made at constant temperatures, the individual viscosities of the six streams can be determined inferentially in Saybolt seconds.

To date, the Sun application has not yet been adapted to direct control of the fractionation operation, although such a step is planned. Stream viscosities could be employed to control tower temperatures at key points or flow rates of internal tower streams.

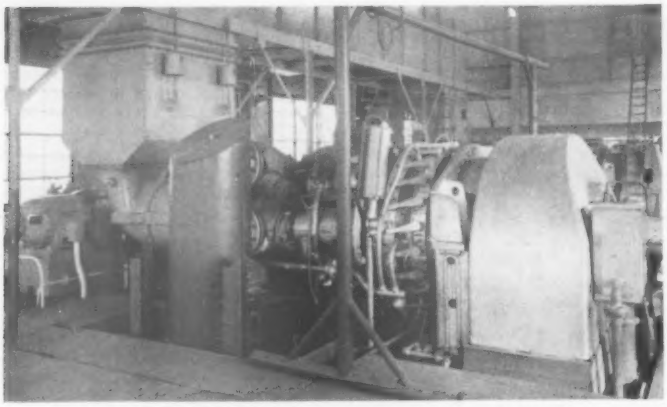
Not yet perfected . . . This commercial application on Sun's vacuum unit has been in operation for 6 months, and development and application work commenced 18 months ago. According to the users, this particular application of the instrument has not yet been brought to final perfection, though they anticipate that it will. The units require careful calibration for the size and shape of the line, vessel, or other enclosed space in which the probe unit is installed, since these factors affect the resonance of the vibrating blade. Once properly calibrated, the instrument vibrates at a frequency which is determined solely by the viscosity or "flowability" of the surrounding fluid.

In addition to Sun, Standard Oil Development Co. and Humble Oil & Refining Co. have been using the new device. Its users outside the oil industry include chemical and rubber companies and medical centers. Stanley R. Rich and Wilfred Roth, who developed the instrument, will be associated with Bendix as consultants in a research affiliation and will be available for special work on problems concerning the instrument's application in industry.

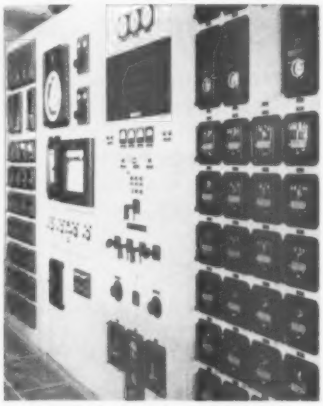
Industry Briefs

NEW YORK.—The American Petroleum Institute said last week its survey of accident statistics show that the petroleum industry's over-all safety record in 1952 was its best in history. The frequency rate of injuries declined to 9.67 per each 1,000,000 man-hours worked. This, A.P.I. said, is the first time the index has ever been below 10.

LONG BEACH, Calif. — The city council of the City of Long Beach has adopted a resolution authorizing city officials to sign an agreement with Richfield Oil Corp. for the release of nearly $26,000,000 in voluntarily impounded tidelands oil money. The money has been impounded since February 9, 1948, because of the legal question of the city's tidelands ownership. The agreement must be approved by the Long Beach Harbor Commission before it can be executed.



INTERIOR VIEW of El Paso Natural's Cornudas, Tex., compressor station . . .



. . . and its master-control panel.

Gas-Turbine Report

First units ever used in major long-line gas transmission attracting wide attention; results exceed expectations

Paul Reed

PERFORMANCE of gas turbines on El Paso Natural Gas Co.'s Permian basin-to-California gas line is exceeding expectations and is drawing engineers and executives from throughout the industry to view the new units in operation.

Ten General Electric gas-turbine units already have been installed on the cross-country artery and nine are now in operation. Eighteen more will be installed in El Paso's program to increase capacity of the line from 901,000,000 cu. ft. to 1,200,000,000 cu. ft. daily.

Installation of the turbines represents their first use on a large scale in the transmission of natural gas over long distances. Their addition, in 10 new stations, will increase the company's compressor capacity on the line by 140,000 hp.

Performance is being closely watched to determine the significance of the new technique. Questions raised have drawn more visitors to the company's Cornudas, Tex., station in recent weeks than to any other facility of the industry. No other technical aspect of gas transmission is stirring up as much discussion.

Decision to use gas turbines was reached by El Paso Natural during a pipe shortage period when intermediate booster stations rather than looping were being considered for raising throughput by 300,000,000 cu. ft. daily. At that time turbines promised the most economical solution for operation in the desert conditions of West Texas, New Mexico, and Arizona.

Background . . . The unique characteristics of gas turbine centrifugal compressor units are being studied for their possibilities in solving certain boosting problems rather than for supplanting gas engine reciprocating compressor units for basic station design for gas lines.

Fuel consumption of 10.5 cu. ft. per hp.-hr. has been reported which is nearly the same as the average for existing reciprocating units which have been in service for a number of years.

While modern types of reciprocating engines having a 30 per cent lower fuel consumption are available for driving centrifugal compressors, through step-up gears, it is asserted by proponents of gas turbines that higher efficiencies for the latter may be expected with the new developments in design even with the use of present available metals. When advances in metallurgy make it possible to run at higher temperatures, even greater increases in efficiency will be possible.

Some recent improvements in mechanical design have induced predictions that a 30 per cent improvement in efficiency may be achieved even at present combustion temperatures. With the metals now available, the maximum practicable combustion temperature is 1,450° F. Actual combustion temperatures for the El Paso gas turbines are said to be about 1,250° F.

Advantages . . . Gas turbine centrifugal compressor units have advantages in low cost of initial installation which is about $50 less per installed horsepower than for reciprocating units. No water and very little lubricating oil is needed. Only six men per station are required for operating personnel. Furthermore, El Paso Natural's gas turbine stations are being equipped so that they could be readily hooked up for remote control from a distant dispatcher's office.

No gas cooling is done at gas turbine stations. Additional cooling is done at downstream "recip" stations to compensate for 25 per cent temperature increase in gas temperature at the turbo-centrifugal stations.

Efficiency of gas turbines increases 25 per cent in the winter when the heaviest transmission loads are carried.

How it operates . . . Basically a gas turbine is mechanically simple with five main features consisting of three turbines, a centrifugal air compressor, and a big heat exchanger.

A high-pressure gas turbine operating at 6,100 r.p.m. drives the air compressor to move fuel air through the heat exchanger, which is a fuel air heater known as a "regenerator." The regenerator has 29 miles of 1-in. pipe carrying exhaust gases which raise the temperature of incoming air by 300° F. so that it goes to the combustion chamber at 600° F. A low pressure or load turbine running at 5,000 r.p.m. drives

the centrifugal compressor. Both high and low pressure turbines have separate shafts.

Starting, stopping, and speed regulation are handled through an elaborate system of electrical control.

A single turn of the starting switch initiates a sequence of 41 operations performed in 19 minutes to bring a unit from a cold start to full operation. In starting, an unfired gas turbine of steam turbine type operated by gas pressure from the pipe line rotates the high-pressure turbine shaft until combustion gas turbine operation is effective.

Desert conditions where water is expensive are naturally inviting for gas turbines. In very cold climates, such as in Canada, where the gas turbines operate at top efficiency they may be attractive particularly where looping would be costly over rugged terrain.

At present efficiencies with high fuel consumption in comparison with modern types of reciprocating gas engines, it is estimated that gas turbines might be practicable for booster transmission service while running on gas costing up to 15 cents per thousand in the field.

Status of El Paso Natural's gas-turbine installations on March 20 was: Cornudas, Tex., station, completed and operating with three units; Florida station, one unit operating; Fordsburg station, two units operating; Benson station, one unit, and the Casa Grande station two units. The Pecos River station No. 1 is complete with one unit not yet in operation.

A special section of eight articles by El Paso executives and engineers will appear in the April 27 issue of The Oil and Gas Journal. Problems relating to gas turbines and centrifugal compressors were discussed in the Journal's Engineering Reference Section in six consecutive installments beginning with the issue of February 9.

Unusual Pilot Project

Dually completed well to be used for gas injection

MIDLAND, Tex.—Conversion of a dual oil well to dual gas injection to initiate a pilot secondary-recovery project in Cree-Sykes field of Runnels County, West Texas, has been authorized by The Texas Railroad Commission.

In a special order issued to Southern California Petroleum Corp. and Mohawk Petroleum Corp., permission was granted to conduct a pilot gas-injection project in the Upper and Lower Gardner sand reservoirs, at 3,955 and 4,020 ft. The companies will attempt to increase oil recovery by introducing gas into a pilot well the 3 Harper, on their 16-well Harper lease.

Reservoir data . . . Core analyses indicate the porosity and permeabilities of both Pennsylvanian sands are similar. Moreover bottom-hole samples of the undersaturated reservoir crude taken in each pay indicate similar magnitude of bubble-point pressures and solution gas-oil ratios.

The Upper Gardner zone, found at 3,955 ft., has an average thickness of 10 ft. and an average porosity of 14 per cent. Initial bubble-point pressure was 1,368 psi., and the solution ratio was 591 cu. ft. per bbl.

The Lower Gardner zone, at 4,020 ft., has an average thickness of 6.5 ft., porosity of 14 per cent and a permeability-to-air range of from 15 to 300 md. Initial bubble-point pressure was 1,302 psi. and solution ratio 570 cu. ft. per bbl.

The area was discovered in July 1950 by G. B. Cree with his 1 Myrtle Allen, Section 9, H. & T. B. Survey, which found oil in the Gardner sand.

(Details of Union Sulphur & Oil Corp.'s plan to inject flare gas into Cree-Sykes and Cree-Sykes East fields may be found in The Oil and Gas Journal, April 6, page 63.)

Depth Record Set

Gulf test, below 16,487 ft., is deepest for West Texas

Carl F. Hoot

ODESSA, Tex.—Gulf Oil Corp. has set a new depth record for West Texas.

Its 1 Northrup in southeastern Reeves County, 30 miles west of nearest production in the Central Basin platform fields, and 20 miles southeast of Pecos, had passed 16,487 ft. and was drilling ahead at the rate of 35-40 ft. per day last week. Orders are to proceed as long as drilling is feasible.

Chances of reaching the Ordovician in Gulf's well are good at this time, as drilling has progressed without difficulties usually encountered at such depths in new areas. Top of the Devonian is expected around 17,000 ft., and on that basis, the Ellenburger may lie as much as —21,000 ft. Parker Drilling Co. is contractor on the test.

Geologically, the test's location is well within the Delaware basin, a deep geologic province of some 10,000 sq. miles, extending 150 miles in length and up to 70 miles wide. On the surface, the basin's location is from Carlsbad, N. M., on the north, to the lower portion of Pecos County on the south.

Significance of the well, in addition to the depth record, will be its contribution to pre-Permian geology of the basin after time has allowed geologists to make correlations with other key wells and evaluate electric logs and cores.

Data needed . . . Outcome of the venture, whether productive or dry, will afford sorely needed data for future drilling in the basin, and at least a part of the answer to the interesting question of what can be expected below 10,000 ft. or more of Permian beds filling the bowl-like basin.

Location of 1 Northrup in 33-50-T8-T&P is 12 miles northeast of a well which finished as a small Wolfcamp producer at about 9,800 ft., to open Verhalen pool. There was no further development drilling in that immediate area and production later tapered off, according to reports. The 1 Roberts had total depth at 14,073 ft., and was thought to be in Pennsylvanian-Strawn at that depth.

For a cross-section map showing the Delaware Basin in relation to the Central Basin platform, and key wells drilled over the past few years, see *The Oil and Gas Journal, February 22, 1951, page 150.*

Commission Funds Increased

AUSTIN.—The Texas Railroad Commission last week was given a considerable increase in spending money for the year beginning September 3.

Both houses of the state legislature adopted a conference-committee report providing an appropriation increase of $470,519, bringing the commission's appropriation for the coming year to $1,660,364. The appropriation for the current year was $1,189,845.

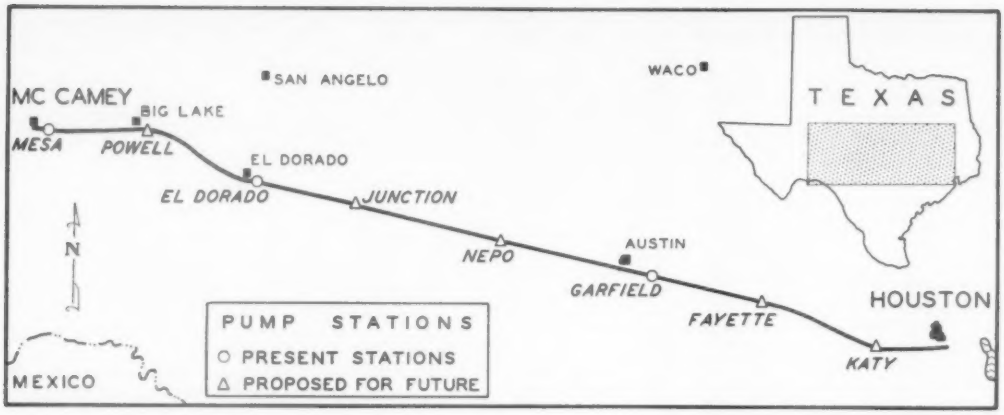
The action increases the salaries of commission members from $10,000 to $10,600 a year and provides a pay hike of $600 or $500 for other key personnel.

Spraberry Hearing Set

AUSTIN.—The immediate future of operations in the half-million-acre Spraberry trend will be determined as the result of court litigation opening here this week.

Temporary restraining orders allowing some 600 wells to continue production are scheduled to expire April 20, at which time District Judge Charles O. Betts is to hear arguments on a permanent injunction.

It was expected in some quarters that Judge Betts would extend the temporary restraining orders preventing the Texas Railroad Commission from executing its order shutting in all production in the field.



Rancho Line Dedicated

Oil men, government officials, property owners attend ceremonies at big crude system's three pump stations

F. Lawrence Resen

AUSTIN.—Rancho Pipe Line System's new 457-mile, 24-in. crude-oil line from McCamey, in West Texas, to the Houston Ship Channel area was dedicated last week with the formal opening of the line's three pump stations.

The line, which has an initial capacity of approximately 210,000 bbl. of crude per day, is designed to handle an ultimate 345,000 bbl. per day with the addition of five new pump stations. Crude oil first entered the system late in February and began reaching the Houston area March 7-8.

Rancho held open house and conducted tours last week at its three pump stations: Mesa station, near McCamey, and western terminus of the line, Bailey station near Eldorado, Tex., and Garfield station near Austin. Guests included, in addition to oil-industry representatives and members of the press, officials of cities and counties along the line's route, state officials, and property owners across whose land the line passes.

The Rancho system is a multiple-ownership project with these seven companies as participants: Ashland Pipe Line Co., Crown-Rancho Pipe Line Corp., Nantucket Pipe Line Co., Pan American Pipe Line Co., Phillips Pipe Line Co., Shell Pipe Line Corp., and Sinclair Pipe Line Co. The line was designed, constructed, and will be operated by Shell Pipe Line Corp.

The line will carry crude oil from West Texas and New Mexico oil fields to refineries and terminals in the Houston area. This is accomplished through tie-ins either at McCamey and Eldorado or through connecting lines of several pipe-line companies. To accommodate incoming crude at the Mesa station, 12 floating-roof tanks, with a total capacity of 1,212,000 bbl. have been installed, and provision has been made for the addition of 11 more.

Crude handling . . . The size of the system is of such a magnitude that other companies had to provide a considerable amount of equipment as may be seen on a breakdown of crude handling requirements.

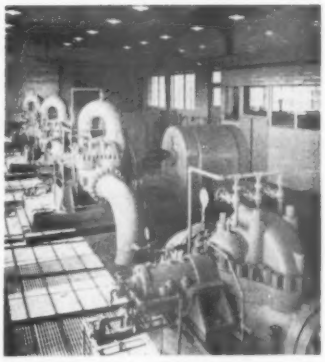
Handling of the incoming crude to the line will be as follows:

1. Crude will be delivered at Mesa tank farm by Texas-New Mexico Pipe Line Co. and Shell Pipe Line Corp. lines.

2. Pan American built its Concho station adjacent to Rancho's Bailey station to deliver into the Rancho system. The Concho station includes three 124,000-bbl. tanks, manifold, and booster pumps for delivery to Bailey. Crude is delivered to Concho storage via Pan American's 16-in. line from Scurry County and 6-in. line from Hulldale-Susan Peak fields.

3. Shell installed tankage and pumps to inject Hulldale-Susan Peak crude at Bailey station.

4. Phillips installed a terminal and pump station near Missouri City to



BIG PUMPS which move crude through the Rancho line, in one of three identical stations on the line. At rear are the three 1,750 hp. pumps, and in the foreground is a 900-hp. auxiliary unit. All are powered by electric motors.

MODERN PUMP STATION on the Rancho line, now moving West Texas and New Mexico crude to Gulf Coast refineries and terminals at a rate of 210,000 bbl. daily. Not shown are cottages at each station maintained for employes and their families.

receive crude from Rancho and pump it to Phillips' Sweeny refinery. Facilities include two 120,000-bbl. floating-roof tanks, a pump station, and a 12-in. line to Sweeny.

5. Pan American installed a 28-mile, 26-in. line from Genoa to its Texas City refinery, and added four new 120,000-bbl. floating-roof tanks at Texas City.

6. Sinclair supplemented present tankage at its Sinco refinery with three new 180,000-bbl. tanks.

7. Crown Central installed a new 131,000-bbl. tank at Pasadena.

8. Shell supplemented present tankage with four new 116,000-bbl. tanks at Deer Park.

Eastern States to receive into existing tankage at Manchester.

Contractors . . . Major contractors on the line were:

Anderson Bros. Corp., which installed approximately 266 miles of main line from Mesa to a point near Cedar Valley in Travis County.

Houston Contracting Co. approximately 189 miles of main line from Cedar Valley to terminals in the Houston area. Part of this section was subcontracted to Oklahoma Pipe Line Constructors.

Station Construction Co., which installed buildings, equipment, and piping at tank farms and stations.

Personnel for the system will number 117, initially with 55 each for operating and maintenance, plus 7 electricians and mechanics.

Two detailed engineering articles by Paul Reed, Journal pipe-line editor, on design and construction of the Rancho system may be found on pages 154 and 156 of this issue.

Secondard-Recovery Permits

AUSTIN, Tex.—The Texas Railroad Commission has granted the following applications relating to secondary-recovery operations:

Water-Flooding

Brown County: James H. Snowden and Texworth Oil Co.'s application to flood the 180-ft. (depth) Upper Canyon sand under their Anderson lease.

Eastland County: W. H. Hoffman's application to water the Strawn sand found at 1,250 ft. under leases in the Nancy Ussury and H&TCRR surveys.

McLennan County: Snider and Wood's application for expansion of a pilot water flood in South Bosque field into a full-scale operation, and for approval of unitization contract.

Pecos County: Dick Duncan's plan to flood the 1,600-ft. Yates sand under his Sullivan "A" lease in Apco-1,600-ft. field.

Shackelford County: Altex Oil Co.'s project for flooding the Tannehill sand in Windham-Tannehill field.

Ibex Co. and R. F. Windfohr's application to flood the 1,400-ft. Fry and 1,575-ft. Bluff Creek sands, underlying their Morris "C" and "D" leases.

Swink Production Co.'s project to flood the 430-ft. Upper Fry sand underlying its Walker Estate lease.

Stephens County: G. B. Cree's project in the Cook sand under his W. H. Green lease.

Throckmorton County: Woodson Oil Co.'s plan to water flood the 650-ft. reservoir under the Putnam "B" lease.

Wichita County: Akin & Dimock and Staley Oil Co.'s flood in the 1,320-ft. Thomas sand.

Gas Injection

Tunstill field, Reeves and Loving counties: Hill & Hill's experimental project to repressure the 3,450-ft. Delaware (Permian) sand reservoir.

Cree-Sykes field, Runnels County: Southern California Petroleum Corp. and Mohawk Petroleum Corp. pilot gas-injection project to repressure the Upper and Lower Gardner reservoirs through a dual gas-injection well.

Moca field, Webb County: H. R. Smith's application to repressure the 450-ft. sandstone reservoir.

Shell Hikes Output

Survey shows Shell has displaced Standard as firm with biggest company-operated crude production in California

D. H. Stormont

LOS ANGELES.—Shell Oil Co., perennial second-ranking California crude-producing company, has taken over first place, insofar as company-operated production is concerned.

When participation in unitized fields is considered, however, Standard Oil Co. of California remains the state's largest crude-oil producer.

During March, when a new record high of 999,700 bbl. daily was being turned out by California fields, the output of Shell's company-operated wells was 103,000 bbl. daily. This was an increase of 14,500 bbl. over its daily output in March 1952. Participation in unitized fields netted it about 800 bbl. more, bringing Shell's total average production to approximately 103,800 bbl. daily.

Company-operated production of Standard of California continued to decline to 94,000 bbl. daily from 96,900 bbl. in March 1952. The company's extensive participation in 11 unit operations, however, gave it an additional 32,100 bbl., lifting its total daily production to about 126,100 bbl.

Biggest increase . . . How the other companies of the "Big Seven" fared in the past year also is shown in the accompanying table. Largest increase of any company was recorded by General Petroleum Corp. It gained about 16,000 bbl. to reach a company-operated total of 50,000 bbl. and a total daily production of 58,000 bbl. The increase largely came about through development of San Ardo properties purchased last year from Jergins Oil Co.

Little change was recorded in Richfield Oil Corp.'s and Tide Water Associated Oil Co.'s production, both showing slight declines. The Texas Co.,

Production Record of California Companies

(Barrels per day)*

	Company-operated prod.		Unit prod.	Total prod.	Oil wells comp.	
	Mar. 1952	Mar. 1953	Mar. 1953	Mar. 1953	1952	1951
General Petroleum Corp.	33,800	50,000	8,000	58,000	102	33
Richfield Oil Corp.	63,700	62,000	10,100	72,100	36	91
Shell Oil Co.	88,500	103,000	800	103,800	177	89
Standard Oil Co. of California	96,900	94,000	32,100	126,100	185	194
The Texas Co.	28,300	36,000	4,000	40,000	128	114
Tide Water Associated Oil Co.	45,700	45,000	2,100	47,100	42	35
Union Oil Co.	64,200	74,000	8,100	82,100	115	89
Total seven companies	**421,100**	**464,000**	**65,200**	**529,200**	**785**	**645**
Large independents and other major companies†	314,500	303,000	61,000	364,000	446	510
Other operators	100,100	100,000	6,500	106,500	514	442
Unit operations	141,500	.....	.....	.....	80	79
Total California	**977,200**	**867,000**	**132,700**	**999,700**	**1,825**	**1,676**

*Production by companies for March 1953 estimated; other data from Conservation Committee of California. †Remaining 43 companies in California's largest 50 classification.

which also drilled many San Ardo wells, showed a gain of about 8,000 bbl. daily.

Union Oil Co. of California, in experiencing probably the most successful wildcatting year of any of the companies, registered a gain of 10,000 bbl. daily. Its total production of approximately 82,100 bbl. daily during March, placed it firmly in third place.

New well completions . . . Shell, by completing 177 new producers last year, almost exactly doubled its record of 1951. About 16 rigs were kept at work constantly in the deep Ventura Avenue field. Development of its South Mountain and Coalinga properties, and of a deeper pay at Brea-Olinda accounted for most of Shell's other new producers.

In completing 102 wells General Petroleum tripled its record of 1951. Union drilled only 26 more producers than in 1951. Aside from Richfield, which greatly curtailed its drilling program, other Big Seven companies were close to their previous year's record.

It is seen in the table that this group accounted for the major portion of last year's drilling increase. Their company-operated production increased about 43,000 bbl. to 464,000 bbl. in March, as compared with a gain of 22,500 bbl. for the entire state.

Of the companies not shown in the table, progress being made by a relative newcomer, Humble Oil & Refining Co., is of interest. Its production in March averaged about 3,600 bbl. daily, an increase of about 1,500 bbl. during the year.

BIGGEST TANKER ever to enter Los Angeles Harbor, The Texas Co.'s 240,000-bbl. Kentucky, is shown tying up with the West Coast's first cargo of Saudi Arabian oil. The Kentucky sailed from Sidon, Lebanon, terminal of the Trans Arabian pipe line.

Imports Boost Slated

Shipments of crude into California will be increased by about 24,000 bbl. daily this year, Follis tells producers

D. H. Stormont

BAKERSFIELD.—Imports of Middle East and Far East crudes into California this year may average about 24,000 bbl. daily more than in 1952, but the state's producers can be assured of a continuing market for their output.

This assurance was voiced by R. G. Follis, chairman of the board of Standard Oil Co. of California, in an address here April 10 before the annual meeting of the San Joaquin Valley Producers Association.

Because of the inability of California fields to supply the West Coast domestic and offshore military demand, Follis stated about 32,000 bbl. daily had to be imported during 1952. This year he expected about 37,500 bbl. will be imported from Sumatra, plus 18,500 bbl. from Arabia.

These crudes all will be of high gravity, so that as much heavy California crude as possible can be used—"we would do nothing to aggravate the heavy crude-oil situation still further," he said.

Heavy-oil demand . . . Follis credited the recent increase of only 10 cents for low-gravity crudes, as compared to 50 cents for light crudes, to slack demand for heavy oils. Dieselization of railroads and greater use of imported Texas gas has created a surplus of heavy oils. This has come about despite reduction of refinery yields of residual fuels to 36 per cent, down 7 per cent from the pre-World War II average.

"Our greatest needs in California are for crudes of higher gravities. In recent years residual fuel-oil demands have shown a serious and basic downward trend. This has been happening while demands for gasoline and other light products continued to increase. It isn't something temporary—it's a basic trend because the markets for heavy residual fuels are not keeping pace at all with the markets for other products.

"We are doing all we can to offset this trend. The industry has spent, and is spending many millions of dollars in efforts to build plants which can convert more heavy fractions into lighter ones. Still, there is a limit to the percentage of light products you can get from any barrel of crude."

Imports "costly" . . . Foreign-oil imports to the West Coast may be necessary for some years to come he indicated, adding:

"These oils, when laid down in California, are much more costly than commonly supposed. They will normally tend to move into the growing markets in the Eastern Hemisphere, which will inevitably remain as their principal outlets."

Speaking of domestic reports, Follis said, "we even have a considerable isolation on the North American continent. A pipe line from Alberta to the Pacific seaboard is almost completed, and it would be possible to build another line from Texas if it were required.

"However, these lines are long and costly, and when in total, their capacities exceed the anticipated future requirements of the district, they reach the border-line beyond which they cease to be economic."

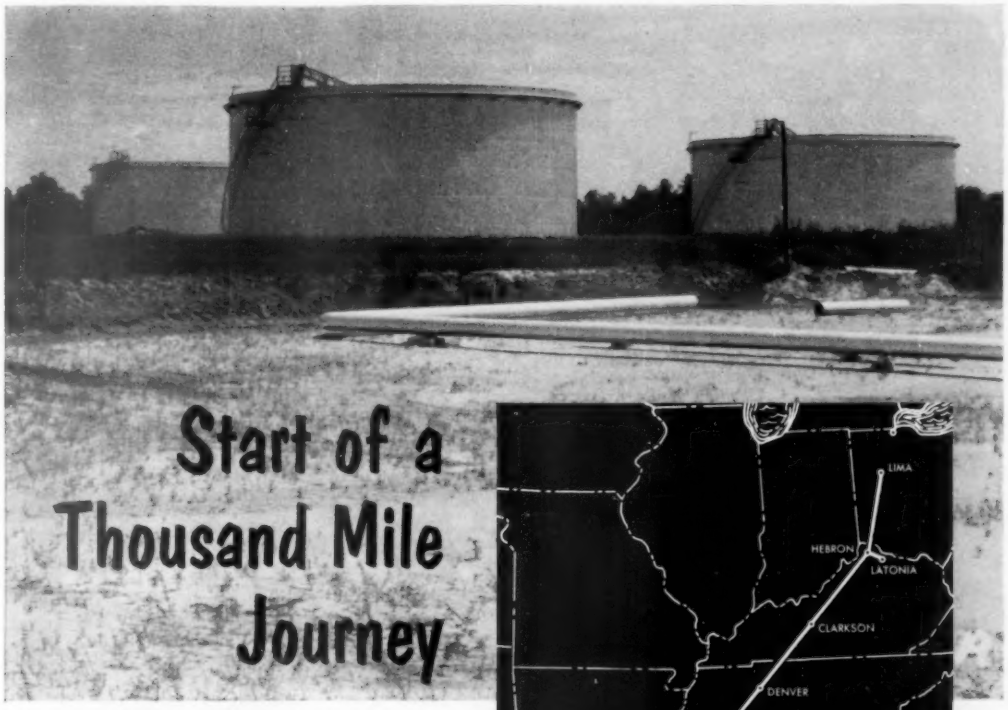
Petersen Attacks Waste

LOS ANGELES.—California is consuming its oil faster than any other major producing area in the world, T. S. Petersen, president of Standard Oil Co. of California, said here last week.

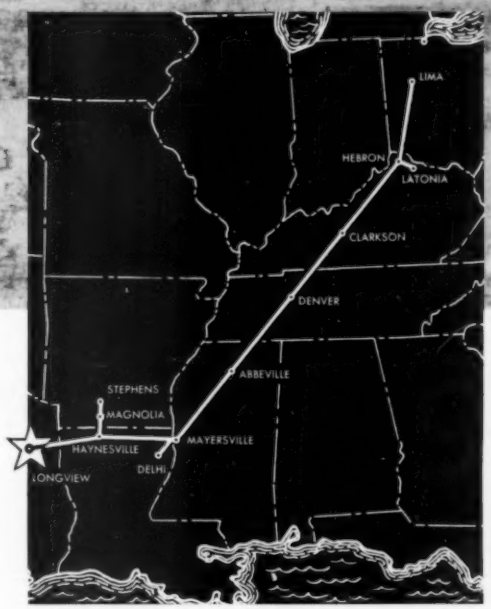
During 1952, Petersen told the Los Angeles Bond Club, the state used 9.3 per cent of its reserves, compared to an 8 per cent rate of the rest of the United States and a 2 per cent rate in the rest of the free world.

Petersen intimated that the difference is due to the lack of conservation law in California. The consequent lack of any official control over production, he said, has meant the permanent loss of millions of barrels of oil.

"Responsible members" of the petroleum industry, he said, have drastically reduced the waste, but he added that some aspects of the problem could be handled only by the state.



Start of a Thousand Mile Journey



From Longview, Texas to Lima, Ohio! Crossing five states, the Mid-Valley Pipeline Company's crude oil-bearing artery crosses the Mississippi, Ohio, and six other rivers in its long journey.

At Longview, Texas, where the 1,000-mile journey starts, modern storage tanks equipped with Horton Double-Deck Floating Roofs are reducing evaporation losses, corrosion and fire hazard. Floating directly on the surface, the entire bottom of the roof is normally in contact with the liquid in the tank. There is no air-vapor mixture above the liquid to be vented and lost. Fire hazard and corrosion are also reduced as a result of the elimination of this vapor space.

Structures built by Chicago Bridge & Iron Company are built in strict accordance with the specifications. A CB&I Field Supervisor checks each step of the work as a structure is erected. This service assures you of tanks with *plus* values . . . the best possible structures and workmanship.

Horton Floating Roofs are built in three types: Double-Deck, Pontoon, and Pan. Write our nearest office for further information, estimates or quotations. There is no obligation on your part.

Top: 81,000-bbl. tanks with Horton Double Deck Floating Roofs at the Mid-Valley Pipeline Company's Longview, Texas terminal. Above: Map of Mid-Valley's 1,000-mile pipe line stretching from Texas to Ohio.

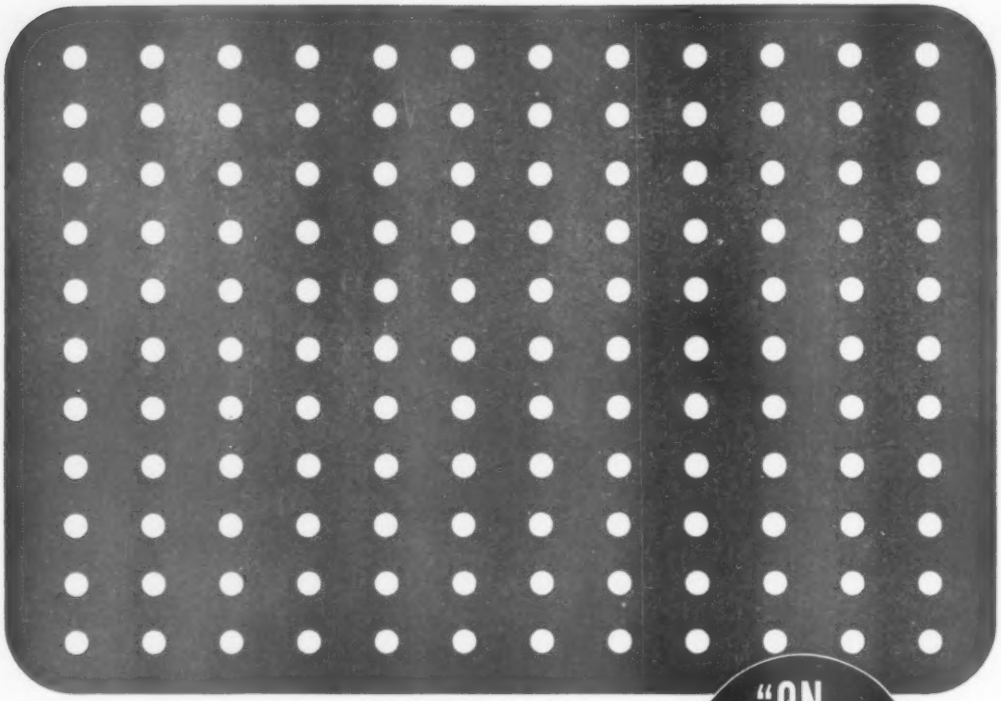
CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025—201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Midland Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 C & I Life Bldg.
Los Angeles, 17.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
San Francisco, 4.....1554—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Sociedado Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194, Sala 704-C, Rio de Janeiro, Brazil
Comprimo N.V., 21, Amstel, Amsterdam (C) Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Wheatoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland



Hit Steel Pipe Requirements

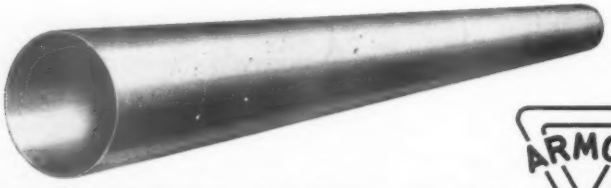
"ON THE DOT"

Each of the dots shown above represents a different wall thickness-diameter combination of Armco Welded Steel Pipe—132 in all. With this wide selection you can meet your needs *exactly!* No longer is it necessary to increase costs by buying useless extra metal.

Diameters range from 6 to 36 inches, with wall thicknesses available from 9/64- to 1/2-inch. Lengths up to 50 feet simplify handling, require fewer joints, speed installation—and cut costs.

The fewer joints you do have to make are easier because of the uniformly beveled ends of Armco Pipe. In addition, you get uniform weldability and ample ductility for field laying by all standard methods. So job costs stay low.

Use Armco Welded Steel Pipe with confidence for conduits, gathering systems and wherever else you need dependable line pipe. Write for details. Armco Drainage & Metal Products, Inc., Welded Pipe Sales Division, 2623 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.



ARMCO

See Our Exhibit
OIL SHOW
TULSA MAY 14-23

ARMCO WELDED STEEL PIPE

Civil Suit Outlined

Justice Department will file against oil firms in cartel case April 21, later petition to ask grand jury dismissal

WASHINGTON.—A civil suit against the oil companies involved in the "cartel case" will be filed in the District of Columbia Federal Court by the Department of Justice April 21, and a week later the department will ask Judge James R. Kirkland to dismiss the grand jury proceedings that have been pending since last September.

It is expected that all of the companies named in the Government's original case will be listed in the civil suit, but there are possibilities that a number of other companies, both domestic and foreign, may be added in what may eventually turn out to be almost as broad a case as the prewar "Mother Hubbard" suit.

Attorneys for the companies were called to Washington April 14 by Atty. Gen. Herbert Brownell, Jr., to discuss a department proposal that they voluntarily agree to produce the domestic records called for under the grand jury subpoenas.

Fight planned . . . Spokesmen for the oil group reportedly told Brownell that after the suit is filed they will answer any request made by the Government, but it was said later that the companies intend to fight the case all the way just as they have been fighting the grand jury investigation and will produce their records only on court order.

Brownell said the meeting with the company attorneys was held in preparation for the steps decided upon by the department for the purpose of enabling it "to learn what it could report to Judge Kirkland on April 28" as to the willingness of the major companies to produce their documents.

Will protect secrets . . . Decision of the administration to switch the attack on alleged participation by American oil companies in an international cartel from criminal to civilian procedure will protect the secrets of the companies and the foreign governments with which they deal but will still leave it necessary for them to disprove the charges made by the Federal Trade Commission in its 1952 cartel report.

The decision to rely on a civil suit was reached after conferences by Brownell with President Eisenhower, other cabinet officers, and the chairman of the joint chiefs of staff.

In effect, the Eisenhower administration is following the course set by former President Truman when, on January 12, he instructed former Atty. Gen. James P. McGranery to drop the grand jury investigation in favor of civil proceedings provided the companies agreed to produce the documents called for in grand jury subpoenas, which the companies refused to do. Submission of these documents, located abroad, the companies said would require the consent of the foreign governments involved.

Dodging issue . . . Brownell, for the moment at least, is dodging the issue of foreign documents. The filing of the civil complaint will be followed by an application for a court order directing the companies to produce documents in the United States relating principally to their operations abroad "and the impact of those activities upon the foreign commerce of the United States," but the submission of documents located abroad will be deferred for subsequent action, "if necessary."

At the same time the Justice Department acknowledged the validity of the companies' contentions that the publication of documents would have serious effects upon our national security and the relations of the United States with other countries.

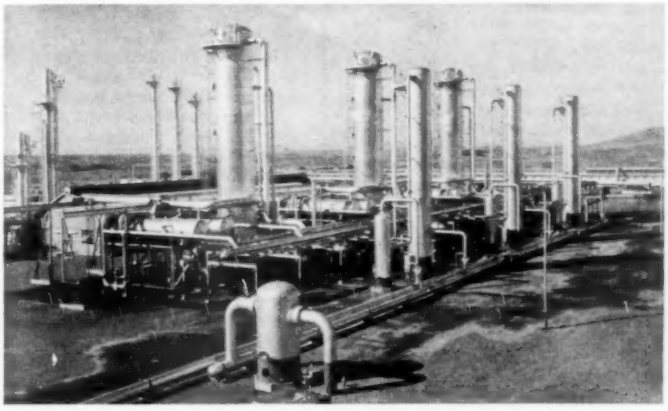
The companies will be given an opportunity to enter into a consent order for production of these documents, but Brownell explained that the rules of civil procedure are so broad that all of the documents called for by the grand jury subpoenas can be ordered to be produced in the civil action.

The department's plans for disposition of the grand jury proceedings will be made known before Judge Kirkland April 28 when the 3-month recess granted in January expires.

Demonstration Plant Closed

WASHINGTON.—The Interior Department has abandoned as unprofitable its demonstration of the production of synthetic gasoline from coal at Louisiana, Mo.

Closing of the plant was announced



World's Biggest Gas Treater in Operation

Three separate plants operating in parallel constitute the San Juan River plant of El Paso Natural Gas Co., near Farmington, N. M. The huge plant processes gas from the San Juan basin's Barker Dome and Blanco fields. Since characteristics of the gas differ, one having 1 per cent hydrogen sulfide and 15 per cent carbon dioxide and the other having no hydrogen sulfide and a low carbon dioxide content, different processing methods are required. During the winter months, capacity of the plant will be about 60,000,000 cu. ft. per day of inlet gas, dropping to as little as 43,000,000 in summer months. The combination of units permits extraction of undesirable components from Barker Dome gas, extraction of valuable liquids from Blanco gas, mixing of the two and dehydrating the mixed stream for movement through El Paso's pipe-line system. A detailed article describing this plant will appear in the April 27 issue of the Journal.

by Secretary Douglas McKay April 13, after more than 5 years of operation at a cost to the Government of about $75,000,000.

The closing of the plant was the second step by the Eisenhower administration to get out of the oil business in the interest of economy. A few weeks ago Secretary of the Navy Robert Anderson announced that the exploration for oil in Naval Petroleum Reserve No. 4 in Alaska would be terminated.

McKay said the Louisiana plant had produced its maximum in the way of studies and tests and in the future would be limited to the laboratories of the Bureau of Mines.

McKay indicated an intention of selling the plant, if possible. Five firms already have expressed interest in it, he said, and he will do all he can to get it into private industry through negotiation.

Plant Sale Asked

Eisenhower urges disposal of synthetic-rubber plants

WASHINGTON. — President Eisenhower asked Congress last week to enact legislation enabling the sale of the government's synthetic-rubber facilities.

The President did not specify any deadline for sale of the plants, but merely asked for legislation permitting disposal of the plants as recommended by the Reconstruction Finance Corp. in March *(The Oil and Gas Journal, March 9, page 76)*.

In his message to Congress Eisenhower expressed agreement with the policy set forth in the 1948 Rubber Act that the security interests of the nation could best be served by a free, competitive synthetic industry.

"From the economic and technological data available to me I am confident that if the government-owned synthetic-rubber facilities are sold as recommended competitive private industry will amply, efficiently, and economically supply our synthetic rubber requirements."

In its report, the RFC recommended that the government invite "indications of interest" from possible purchasers of plants.

The RFC did not attempt to put price tags on any of the plants, but made it clear that they should be sold at prices representing more closely their real value at a maximum "consonant with the attainment of a competitive industry" rather than merely that part of their cost not yet recovered by the government.

WATCHING WASHINGTON

Bertram F. Linz

All Tangled Up

Congress is getting itself tangled up on two pieces of legislation of interest to the oil and gas industry.

On revision of the Taft-Hartley Act a very confused situation is developing. The Senate labor committee is determined to make changes in the law but apparently has no clear-cut ideas as to what the changes should be. It is likely to go much further than the administration recommendations and come up with something like a material rewriting of the act. The House labor committee may prove far more conservative and there is a chance no agreement will be reached before Congress adjourns in August.

Extension of the Defense Production Act also is shaping up into something of a problem. The Senate banking committee has written a bill which Democrats tauntingly say is much stronger than anything they ever gave former President Truman. It provides, for the first time, for a 2-year extension of the law and for authority of the President to impose a wage-price freeze on his own initiative. Last year, Congress permitted only a 1-year extension and restricted the authority over price and wage controls.

House leaders still are standing firm against the inclusion of any controls, other than possibly on rents, in the new bill and it appears now the result will be a vigorous fight in the conference committee to which the legislation eventually will go.

The Warning Is Out

Opponents of state ownership of the oil and gas resources of the marginal seas are charging that the tidelands legislation is only the first step in a drive to deprive the federal Government of all its natural resources.

If the 3-mile water belt is returned to the coastal states, they warn, it will set off a drive against the resources of the public lands.

Some 160,000,000 acres of forest lands, about one-fourth of the national total, are owned by the Government. The big lumber companies, it is asserted, will attempt to have the present restrictions on timbering removed so that they can cut as much as they please.

About 230,000,000 acres of government lands are classified as grazing lands, and stock raisers are permitted to use them during the summer months for specified numbers of cattle and sheep. The stock raisers are charged with planning a move to get what would amount to effective control of these lands without actual ownership.

Also, it is said, a well defined move is under way in the public land states to denationalize the mineral and oil-bearing lands.

And finally, the electric power companies are urging the sale by the Government of its hydroelectric projects, including the Tennessee Valley Authority.

All this, and more, it is warned, if Congress enacts the tidelands legislation.

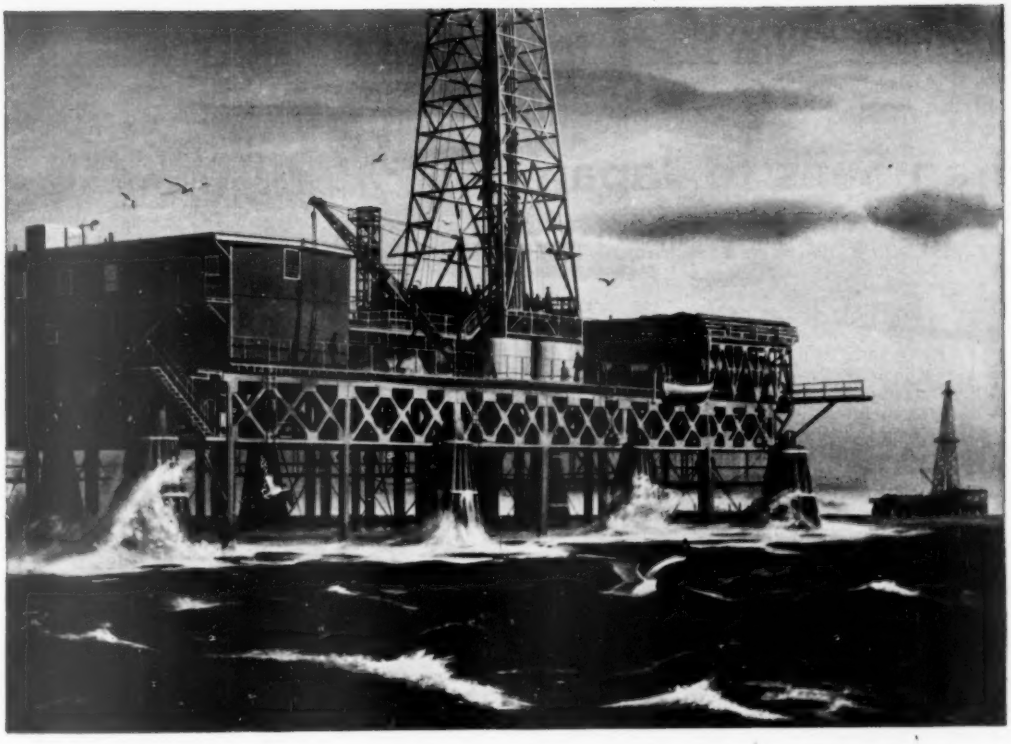
Chances Fading Fast

Chances of a quota on imports of foreign oil this year are dimming as Republican leaders in Congress indicate they will support President Eisenhower's recommendation that the Reciprocal Trade Agreements Act be extended for 1 year without any changes in its provision.

The President asked that this course be taken to give time for completion of a thorough reexamination of the whole economic foreign policy of the United States and the development of solutions to the oil and other international economic problems which the reciprocal trade agreements have raised.

The President's views and the support they are getting in Congress are seen as minimizing the chances of putting through either a quota on oil imports or the stiffening of the provisions designed to protect American industry from undue hardship from low-duty imports.

The House ways and means committee is scheduled to open hearings on extension of the act this week. Representatives of the domestic oil, coal, and railroad industries and organized labor will make a vigorous attempt to secure restrictions on imports of residual fuel oil and the independent producers and refiners will also urge restrictions on crude.



OVER OR UNDER...LAND OR SEA...BROWN & ROOT'S EXPERIENCE CAN SAVE YOU MONEY . . . TIME!

Four decades of diversified experience in heavy construction and engineering has developed a "know-how" for Brown & Root which can be invaluable to you. Over the years Brown & Root's technological developments have provided important savings of time and money for many clients.

Regardless of your interest, be it in finished products—fabricated parts or basic materials Brown & Root can help you. Centralized responsibility coordinates engineering and construction. This plus loyal personnel will save your firm time . . . money.

If your company contemplates new construction or plant expansion a call from you will place Brown & Root plant planning experts at your disposal.

BROWN-BILT

BROWN & ROOT, Inc. *Engineers • Constructors*

P. O. BOX 3, HOUSTON 1, TEXAS

CABLE ADDRESS — BROWNBILT

Associate Companies:— BROWN ENGINEERING CORP. • BROWN & ROOT MARINE OPERATORS INC.

INTERNATIONAL

MIDDLE EAST

Iran Sells to Japan

Big products shipment heads for Far East; it's a major threat to attempts to deny Iran use of British properties

Dahl M. Duff

A JAPANESE oil-marketing company joined the trade in Iranian oil last week when the tanker Nissyo Maru took on a cargo of gasoline and fuel oil at Abadan.

The shipment marked another and more threatening break in the virtual embargo on Iranian oil that developed following the nationalization of the industry and the world-wide warnings of Anglo-Iranian Oil Co., Ltd., that it still held legal claim to production from its properties.

The cargo loaded by the Nissyo Maru was reported to amount to 18,000 tons, roughly 126,000 bbl. This is by far the largest of any of the several cargoes taken out of Iran to date.

The Japanese company involved in this shipment is Idemitsu Kosan, a substantial independent distributor. Idemitsu Kosan owns ocean terminals and retail outlets and supplies about 10 per cent of the over-all Japanese market which last year showed an estimated inland consumption of about 86,000 bbl. daily.

As far as is known, Idemitsu has no interest or tie-in with any of the Japanese refineries. Although there are a few independent plants, most of the Japanese refineries, which last year ran 77,000 bbl. daily, are linked by equity or supply arrangements to the major international companies.

After the Nissyo Maru loaded at Abadan, the British minister in Tokyo conferred with Japan's vice foreign minister, and it was assumed Britain had made clear its opposition to the transaction. The Japanese Ministry of International Trade and Industry was reported to have approved purchase of 24,000 tons of Iranian oil with dollar exchange, and it was pointed out the purchase was legal so far as Japan's laws were concerned.

The Idemitsu company said in Tokyo that its purchase of Iranian oil was a reciprocal deal and that in return it would send Japanese textiles, machinery, tires, and other commodities to Iran. The company said it has signed an agreement to buy unlimited quantities of Iranian oil products at prices "lower than those in the international market." The Idemitsu company, which has been importing products and some crude into Japan from the West Coast and other supply areas, is understood to have had the allocation for exchange based on its prewar market position.

The Nissyo was expected to avoid Singapore and other British ports on its return voyage to Japan. Anglo-Iranian will probably take legal action in Japanese courts to claim the cargo after the vessel arrives.

Trade growing . . . Meanwhile the trade in Iranian oil by small, unaffiliated Italian firms was expanding. The second and third cargoes bought by the Italian Supor company were landed in Italian ports, the Alba, carrying a reported 75,000 bbl. of crude oil, at Leghorn, and the Miriella, with another 30,000 bbl. of fuel oil, at Venice.

In Rome, Anglo-Iranian amended its court suit against the Supor company to include these later shipments. Arguments before the Rome Tribunal were scheduled to be heard late last week. Anglo-Iranian lost in an effort to have the Miriella's first cargo last February impounded, but subsequently filed another action in Rome for a full determination of the ownership issue.

The Epim company, the other Italian firm involved in the Iranian oil trade, loaded about 37,000 bbl. of crude oil at the Iranian port of Bandar Mashur east of Abadan in the Persian Gulf. This company was reported to have contracted to lift 400,000 tons during the next 6 months, an amount equal to about 16,000 bbl. daily.

The Iranian official in charge of sales for the National Iranian Oil Co. said that three more Italian tankers are on their way to pick up Iranian oil in the Persian Gulf.

On the Iranian political front, the prime minister, Dr. Mossadegh, continued locked in a struggle with supporters of the Shah over the immediate issue of the control of the country's army. Dr. Mossadegh's moves against the country's monarch aroused the antagonism of the military group. The government took stern measures to suppress new demonstrations in Teheran.

Iraqi Crude Up for Sale

The Iraqi Government is offering to sell its royalty crude oil during 1954 f.o.b. Eastern Mediterranean or Persian Gulf terminals with preference given to buyers providing "scarce currencies," namely dollars.

Similar offers were published about a year ago, but no sales were made and the government turned the crude back to Iraq Petroleum Co., Ltd., at prevailing world prices as stipulated under terms of 50-50 participation agreement negotiated late in 1951 by the government and the company.

The Iraq Government is obviously hoping to attract United States buyers for the crude. The quantities offered were listed by quarters and work out to between 68,000 and 70,000 bbl. daily. This represents the government's 12½ per cent share of the production. Most of it is Kirkuk crude at either Banias, Syria, or Tripoli, Lebanon. Purchasers have until the end of May to submit offers.

EUROPE

Avgas Capacity Needed

No new facilities now planned in connection with European expansion program, although demand gain is expected

CONSTRUCTION of substantial facilities for aviation gasoline production in Europe is commercially feasible and would contribute materially to the security of the free world.

Despite the prospect of increasing demands for aviation gasoline in the Eastern Hemisphere over the next few years and continuing demand at high levels for at least a decade, Deputy Petroleum Administrator J. Ed Warren said last week in Washington, no new capacity for this production is now known to be planned in connection with current European refinery expansion.

Figures compiled in the Petroleum Administration for Defense indicated that, in view of the steadily increasing demand in this hemisphere, European refiners could find substantial long-term markets in Eastern Hemisphere.

Consumption in that area last year was 53,100 bbl. daily and is estimated at 58,600 bbl. a day by 1962 after reaching a peak of 62,300 bbl. daily in 1957. Eastern Hemisphere production last year was only 6,600 bbl. daily, nearly one-third of it produced with alkylate imported from the Caribbean, and most of the remainder was provided from the United States.

Demand trend . . . PAD estimates that total demand for aviation gasoline in Europe, 28,000 bbl. daily last year, will reach a peak at 32,300 bbl. daily in 1957 before leveling off over the following 5 years as jet-powered aircraft begin to replace conventional-engine planes, dropping to 27,400 bbl. a day by 1962.

In the rest of the Eastern Hemisphere the increase in demand will be constant over the decade, rising from 25,100 bbl. daily last year to 31,200 bbl. daily in 1962.

In the Western Hemisphere outside the United States, the trend will continue upward throughout the next 10 years because of the slower growth in the use of jet planes than in Europe. Production last year in the Caribbean countries, Mexico and Canada was approximately 31,500 bbl. daily, but Western Hemisphere consumption outside the United States was 22,400 bbl. daily and is expected to reach 38,400 bbl. daily in 1962.

In view of these estimates, Warren said, the construction of additional aviation-gasoline manufacturing facilities in soft-currency European countries would appear to be commercially attractive.

Refinery Expansion Planned

An application asking approval of plans to modernize and expand the Hamburg - Finkenwerder refinery has been submitted by BP Benzin-und Petroleum - Gesellschaft, m.b.H. (Anglo-Iranian Oil Co., Ltd.), to the West German Association of Crude Producers and Refiners.

The refinery now has a capacity of about 700,000 tons, or about 14,000 bbl. daily. The plans call for an additional distillation plant consisting of atmospheric and vacuum units, with annual throughput capacity of 580,000 tons, and a platformer with an annual capacity of 330,000 tons. On completion of the program, the refinery will have an intake capacity of approximately 25,000 bbl. daily.

French Test Slated

Esso Francaise is scheduled to start its first well on an exploratory block in southwestern France the latter part of April.

The venture will test a feature about 50 miles south of Bordeaux. The well will be drilled by a French contractor using the rig which recently finished a test in the 13,000-ft. range for a French company farther south.

Esso Francaise received exploration rights in February 1951 over the area which is centered on Bordeaux and covers about 6,500 sq. miles. Terms stipulated a drilling obligation and provided minimum rates of expenditure. The company has covered the area with gravity meter, carried out a small amount of magnetometer work, and done seismograph and core drilling in selected areas.

AUSTRALIA

Work Progressing

Construction half complete on Shell's Melbourne plant

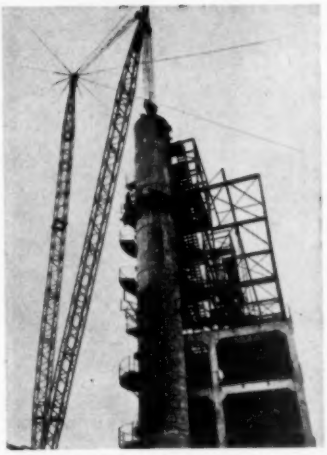
CONSTRUCTION work on the new 25,000-bbl. daily refinery of Shell Oil Co. of Australia, Ltd., at Geelong near Melbourne is now at approximately the halfway mark.

The main process unit, the distillation equipment, was ordered by Shell from Werkspoor, Ltd., of Utrecht in the Netherlands. Werkspoor is one of seven firms now working on the site under contract for different phases of the project.

The Geelong refinery is being built on a 250-acre site and is scheduled to go into operation the middle of next year. Crude for the plant will be supplied from Shell's Seria field in British North Borneo where production of about 100,000 bbl. daily has been developed.

Longest products line . . . In connection with the refinery project, Shell is laying a 36-mile, 8-in. products line which will be the longest in Australia. It will extend into Melbourne and will have a capacity of about 20,000 bbl. daily. It is due to be completed by the end of this year.

The Geelong Harbor Authority is preparing to dredge the port approaches to a depth of 32 ft. to accommodate 18,000-ton, general-purpose tankers, 50 of which are now being built in British and Dutch yards for the Shell fleet. Thirty-four storage tanks with a total capacity of about 1,500,000 bbl. are under construction at the refinery.



TOP SECTION is added to the distillation column at Shell's new Melbourne refinery in Australia.

The Shell plant is one of four major refinery projects under way in Australia. Largest is the 60,000-bbl.-daily plant being built near Fremantle in western Australia by Anglo-Iranian Oil Co., Ltd. Subsidiaries of Standard-Vacuum Oil Co. and California Texas Oil Co., Ltd., also are constructing refineries of about 22,000-bbl.-daily capacity each. Total cost of the Australian refinery construction now under way is the equivalent of nearly $200,000,000.

Refinery Work Started

Australian Oil Refining, Ltd., a Caltex subsidiary, has commenced construction work on a new 22,000-bbl. daily refinery at Kurnell, Botany Bay, New South Wales, Australia.

The refinery will produce a full line of primary products, with gasoline, including high-octane motor fuel, accounting for nearly half of the total output. The plant is scheduled to go on stream before 1956 and will be manned by a force of about 600.

The project is estimated to cost £25,000,000, or about $56,500,000.

FAR EAST

Gas Study Planned

C. Stribling Snodgrass, formerly director of the foreign division of the Petroleum Administration for Defense, arrived recently in Karachi, Pakistan, to begin a study of natural-gas utilization on behalf of Pakistan Petroleum, Ltd. (Burmah Oil Co., Ltd.)

Snodgrass will prepare a report on

YES *and in all of these states*

for Oil and Gas Loans

In Louisiana, as in other great oil producing states, The National Bank of Commerce is ready, willing, and able to be of service to oil operators. The same prompt, confidential, specialized oil and gas loan service that you would get if you were right in Houston. You deal with oil men who are thoroughly familiar with the oil business . . . men who speak your language.

Like the scores of successful oil operators who have come to The National Bank of Commerce for counsel and financial assistance, you, too, are invited to discuss your problems with us.

E. O. BUCK, VICE PRESIDENT, OIL LOAN DEPARTMENT

THE NATIONAL BANK OF COMMERCE

OF HOUSTON

Gulf Building, Houston, Texas "The Bank for All the People"

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

COLORADO • WYOMING • NEBRASKA • NEW MEXICO • TEXAS • LOUISIANA • MISSISSIPPI

possibilities of distribution of gas from Sui in Baluchistan to other parts of the country, including Karachi via Sukkur, Rohri, and Hyderabad. Pakistan Petroleum discovered gas at Sui last year and his since completed a second well which has confirmed appreciable reserves in the area.

Pakistan Petroleum said the report by Snodgrass would be made available to the Government of Pakistan. Before joining PAD in February 1951, Snodgrass was a vice president of Bechtel Corp. He has served as consultant to the Brazilian Government on fuel problems and adviser to the Saudi Arabian Government on its development program.

LATIN AMERICA

Ganso Azul Sold

Texas Gulf Producing acquires majority interest; plans call for drilling more wells, sale of crude oil to Brazil

A UNITED STATES group headed by Texas Gulf Producing Co., Houston, has completed negotiations for the purchase of the Ganso Azul (Blue Goose) properties in eastern Peru.

Texas Gulf Producing announced a new Peruvian company, Ganso Azul Cia. de Petroleo, had been formed to acquire substantially all the outstanding stock of Cia. de Petroleo Ganso Azul, Ltda., and take over operations of the properties. Texas Gulf Producing will own about 80 per cent of the new company's stock, with Kendall Refining Co., Bradford, Pa., and Bay Refining Corp., Saginaw, Mich., each having a 10 per cent interest.

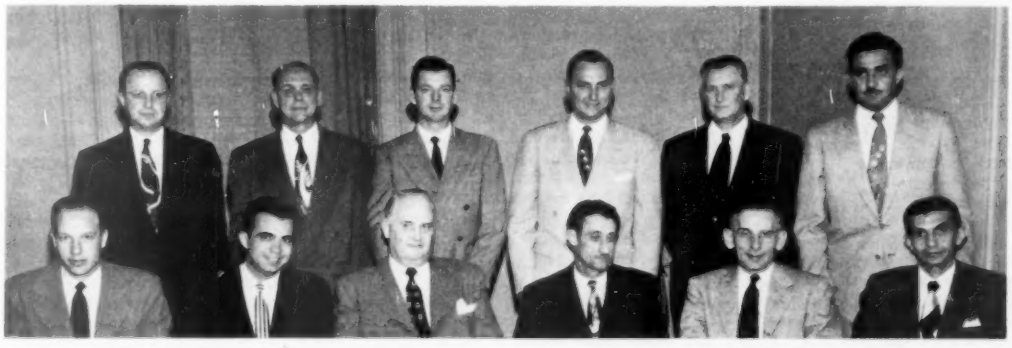
Although Texas Gulf Producing did not identify the sellers, Ganso Azul has been controlled by United States and Peruvian interests, including a group on the West Coast. President of the old Ganso Azul company was J. D. Peeler; H. de Lavalle was vice president.

Texas Gulf Producing said the group paid about $1,000,000 in cash with an additional $3,000,000 to be paid out of future crude-oil sales. It is expected that certain Peruvian interests will purchase an interest in the oil properties.

Future plans . . . The Texas Gulf Producing group plans to concentrate on crude-oil sales in Brazil, an area which the purchasers regard as a potentially profitable market outlet. Shipments would be made by barge down the Ucayali and Amazon rivers. In this connection, the Brazilian Government has had long-pending plans for a refinery at the mouth of the Amazon and more recently there has been talk of a smaller plant at Manaus. The Ganso Azul properties are about 2,800 miles upstream from the Amazon's mouth.

Texas Gulf Producing said initial plans call for the drilling of eight shallow wells to extend the productive area. There are now seven commercial wells on the concession producing around 500 bbl. daily of 43°-gravity paraffin-base crude from depths of about 1,100 ft. Included in the small integrated operation is a 700-bbl. daily topping plant which has served the needs of the local market. Last year the Ganso Azul company, acting under the new Peruvian petroleum law, applied for additional acreage in the vicinity of its present concession.

The Agua Caliente concession from which the Ganso Azul obtained its production consists of about 74,000 acres. It is located on the Ucayali River, a tributary of the Upper Amazon in East Central Peru, approximately 600 miles upstream from Iquitos in northeastern Peru. The concession is about 300 miles northeast of Lima across the Andes Mountains.



Guests of the Los Angeles Nomads

These foreign visitors were guests of the Los Angeles Chapter of Nomads at the group's regular monthly dinner meeting earlier this month. They are: (standing, left to right) Paul G. Reed, The Texas Co., in charge of foreign personnel; Alvin W. Tucker, Trinidad Oil Field Service Co., Trinidad; John G. Luttrell, Socony-Vacuum, Venezuela; George E. Kunkel, Colombian Petroleum Co., Colombia; Richard C. Harris, Union Oil Co. of California, Costa Rica; Haroldo Ramos da Silva, Conselho Nacional do Petroleo, Brazil; (seated, left to right) Thomas A. Moore, Texas Petroleum Co., Venezuela; Edward A. Rosenquist, Socony-Vacuum Oil Co., Inc., Venezuela; John C. Sample, General Petroleum Co., speaker; Jesse F. Roberts, D. & E., Iran; Karl B. Jouman, Basrah Petroleum Co., Iraq; and Geonisio C. Barroso, Conselho Nacional do Petroleo, Brazil.

PERSONALS

Pipe-Line President

T. E. Swigart has headed Shell company since 1940

THEODORE E. SWIGART, president of Shell Pipe Line Corp., Houston, is a native of the California oil country.

He first worked in the oil fields during college vacations from 1913 to 1917. He received his bachelor's and master's degrees in engineering from Stanford University.

Following World War I he worked 5 years for the U.S. Bureau of Mines at Bartlesville, Okla., and Washington, D.C. He received a furlough from the Bureau in 1923 and 1924 and was commissioned by Attock Oil Co., Ltd., and India-Burma Petroleum Co., Ltd., London, to visit oil fields in India and Burma as consulting petroleum engineer.

Swigart began his continuous association with Shell interests in 1924 as chief production engineer. Six years later he moved to Houston as vice president of Shell Petroleum Corp. He became head of Shell Pipe Line Corp. in 1940.

He received the American Petroleum Institute's Certificate of Appreciation in 1948 for his 25 years' work in the organization's Division of Production. At present, he is a director of the A.P.I.'s Division of Transportation and a member of the Committee of Five, appointed to reevaluate the Institute.

He also has been a director of the Mid-Continent Oil & Gas Association and Texas Mid-Continent Oil and Gas Association for many years. In 1946 he was awarded the latter's distinguished-service award.

During his service with Shell Pipe Line, the corporation has expanded its main and trunk line operations. In 1942 the Bayou pipe line system, which moves products from Texas refineries to Baton Rouge, La., was built by the company for itself and five other companies. The new Basin pipe-line system and its connecting Ozark pipe line system, a 22-in. line from Cushing, Okla., to Patoka, Ill., was built in 1948-49. It is owned by Shell and others.

Shell Pipe Line's latest major project is the new 457-mile, 24-in. Rancho pipe-line system recently placed into operation between McCamey, Tex., and the Houston area.

W. E. Church, Los Angeles, superintendent of communications for Shell Oil Co., has been elected president of the Petroleum Industry Electrical Association; **G. B. Jamison,** Houston, has been elected president of the Petroleum Supply Association; **H. L. Renking** and **Frank Hamm,** both of Dallas, were elected vice president of P.E.S.A. New officers of the P.I.E.A. are: **J. A. Polhemus, Jr.,** San Francisco, vice president; and **E. E. Comstock,** Bartlesville, Okla., secretary-treasurer. **F. J. Geisel,** Dallas, was named general chairman for the P.I.E.A. 1954 convention, which will be held in Dallas.

M. D. Bryant, San Angelo, Tex., recently elected president of the Texas Independent Producers and Royalty Owners Association, has been appointed to membership on the National Petroleum Council. **Bryant succeeds Bryan W. Payne,** outgoing president of the association. **Douglas McKay,** secretary of the interior, also has designated **Roland V. Rodman,** already a member of the council, as ex-officio representative of the Western Petroleum Refiners Association on the council. Rodman, the president of Anderson-Prichard Oil Corp., Oklahoma City, is the newly elected president of the W.P.R.A.

Adrian C. West, research engineer for California Research Corp., has been named recipient of the Walter D. Hodson junior award of the American Society of Lubricating Engineers. The presentation was scheduled for the society's annual banquet in Boston April 14. West was given recognition for his paper "Friction and Boundary Lubrication," presented to the A.S.L.E. northern California section last year. He has been with California Research, a Standard Oil Co. of California subsidiary, since 1946.

W. H. Mitchell, production foreman for The Texas Co., has been transferred from Palestine to West Columbia, Tex.

Avery E. Smith, formerly a reservoir engineer for Sun Oil Co. at Evansville, Ind., has been appointed a geologist for Felmont Oil Corp. at Owensboro, Ky.

R. L. Bird, Jr., Columbian Carbon Co., Charleston, W. Va., has been elected chairman of the eastern district, Division of Production of the American Petroleum Institute. Officers were elected during a 3-day spring meeting in Pittsburgh recently. Vice chairmen elected were: **Paul G. Benedum,** Hiawatha Oil Co., Pittsburgh; **Harry Brown,** Chartiers Oil Co., Pittsburgh; **J. F. Buckwalter,** Ryder - Scott Co., Bradford, Pa.; **Jack Cashell,** Preston Oil Co., Columbus, Ohio; **J. Robert Horner,** Delaware Gas Co., Clarksburg, W. Va.; **Fred C. Newman,** Old National Bank, Evansville, Ind.; and **Douglas Rogers,** South Penn Oil Co., Bradford, Pa. Newly elected secretary-treasurer is **R. J. Murdy,** New York State Natural Gas Co., Pittsburgh. **John T. Galey,** Pittsburgh independent producer and chairman of the eastern district the past year, was made chairman of the advisory committee. **Carl A. Young,** Dallas, director of the A.P.I. Production Division, was elected an honorary member of the eastern district's advisory committee.

Frank M. Allen, Oklahoma City, has been named district superintendent in charge of the new gasoline plant of Cities Service Oil Co. (Del.) near Blackwell, Okla. Allen will continue to supervise operation of the company's Oklahoma City gasoline and chemical plants. On his staff at the new plant will be **Guy W. Duren,** Wichita, who will supervise operations, and **F. P. Dyer,** Hutchinson, Kans., who will supervise maintenance. Allen has been with Cities Service since 1929 and was named district superintendent of Oklahoma City district operations in 1947. Dyer formerly was construction superintendent at the new Hutchinson L.P.G. storage terminal. Duren has worked at the company's Burrton, Arkansas City, and Wichita gasoline plants in Kansas as an engineer.

PERSONALS

Louis C. Stork has joined the American Petroleum Institute in New York as supervisor of the abstracting section which is being organized. Since 1946 he has been supervisor of the Beacon, N. Y., laboratories of The Texas Co. He has been with Texaco since 1942. He is a native of Brooklyn and received his B.A. degree from Yale University in 1935 and his M.A. degree from Columbia University in 1940.

Joe D. Ramey, production engineer for Skelly Oil Co., has been transferred from Velma, Okla., to Hobbs, N. M.

William D. Buchanan, of Sequoit, near Utica, N. Y., has been appointed superintendent of a new eastern district created by New York State Natural Gas Corp. He formerly was assistant superintendent of the northern district. The eastern district will handle gas deliveries to Niagara-Mohawk Power Corp., Crystal City Gas Co., and New York State Electric & Gas Corp.

Hugh Lamberth, assistant director of materials in the Petroleum Administration for Defense, has resigned to join the Central Intelligence Agency.

J. O. Hendricks, formerly a tool pusher for McConnell Drilling Co., at Clear Creek, Utah, has joined Lovell & Daniels Drilling Co. at Scobey, Mont., in the same capacity.

Don B. Camblin, industrial-relations manager for Continental Oil Co.'s southern and southwestern regions at Houston, has been appointed assistant superintendent of the company's Ponca City, Okla., refinery.

J. W. McMillen, oil producer, has been elected mayor of Midland, Tex., for a 2-year term. Oil men named to the city council include **R. A. Estes,** assistant division civil engineer for Humble Oil & Refining Co., and **John M. Hills,** consulting geologist.

Fred Goerner has resigned as chief development geologist for Standard Oil Co. of Texas at Houston to become division exploration manager for British American Oil Producing Co. there. Goerner is a graduate of the University of Texas. In his new position he will direct exploration activities in the Texas Gulf Coast, southern Louisiana, Mississippi, Alabama, Georgia, and Florida.

John L. Medis has been promoted from assistant division superintendent of the Rocky Mountain division of the drilling department of Kerr-McGee Oil Industries, Inc., to superintendent. **Eddie A. Baxendale** has been named assistant division superintendent.

J. C. Byrd has joined the geological staff of Midstates Oil Corp. in Shreveport. He formerly was a geologist for Pan Am Southern Corp. in the North Louisiana area.

L. J. Kelly has been named manager of the newly established refinery process division of M. W. Kellogg Co. **Charles C. King** will direct the new chemical processes division.

Morton A. Sterling has been elected executive vice president of Sunset Oil Co. He formerly was a vice president. New officers elected include: **Leo Pearlston,** vice president; **David Oreck,** vice president; and **H. G. McKay,** assistant vice president. **B. L. Majewski,** president of Great American Oil Co. of Chicago, has been elected to fill a vacancy on the board of directors.

J. T. Randell has returned to England to resume his position as managing director for Geophysical Prospecting Co., Ltd., of London. The company is the parent firm of Geophysical Prospecting Co., Canada, Ltd., of which Randell formerly was general manager.

William S. S. Rodgers, director and member of the executive committee of The Texas Co., has been elected a director of Empire Trust Co. Rodgers also is a director of Freeport Sulphur Co.

J. H. Casey, district geologist for General Petroleum Corp. at Santa Maria, Calif., has been named to assume the same duties in the Ventura basin district. **R. G. Colvin,** formerly assistant geologist at Bakersfield, Calif., has been promoted to district geologist at Santa Maria. **C. D. Edwards** will take over the duties of district geologist for the San Joaquin district, replacing **W. D. Lewis,** who is resigning. Edwards, who advances from his former post as geologist at Ventura, will have his headquarters in Bakersfield.

W. O. Keller and **L. F. Peterson** have moved offices of their petroleum consulting firm, Keller & Peterson, from Midland to Fort Worth.

F. W. BOWEN

Frank W. Bowen has been appointed superintendent of the Sun Oil Co. refinery now under construction at Sarnia, Ont. He formerly was chief chemical engineer at Sun's Toledo refinery. In his new post he will supervise plant operations under the direction of **Gordon E. Henderson,** whose appointment as manager was recently announced. Bowen joined Sun at its Marcus Hook, Pa., refinery after completing graduate work in chemical engineering at Cornell University.

James Dowdy has been transferred from Houston to New Orleans as a geologist for Pure Oil Co.

Roy Watkins has been appointed a geologist for C. M. & W. Drilling Co., Denver.

Dr. Gustav Egloff, director of research for Universal Oil Products Co., has been elected an honorary member of the Association Francaise des Techniciens du Petrole at Paris.

S. D. Bechtel has been elected chairman of the board of Trans Mountain Oil Pipe Line Co., and **R. L. Bridges** has been elected president. Other officers and directors elected at a recent meeting of the board of directors in Toronto include: **H. H. Anderson,** vice president and general manager; **S. M. Blair,** vice president; **I. G. Wahn,** secretary and assistant treasurer; **R. F. B. Taylor,** treasurer and assistant secretary; **W. M. V. Ash, R. D. Baker, J. W. Hamilton, J. K. Jamieson, J. K. Spratt,** and **W. J. Wolkins,** directors.

Vincent J. Nolan, Mount Vernon, independent oil operator, has been named to the Oil and Gas Advisory Board in the Department of Mines and Minerals of Illinois by **Gov. William G. Stratton.** Also appointed to the board were **O. D. Harper,** Mattoon, tri-state divisional manager for Carter Oil Co., and **Clarence T. Smith,** Illinois representative on the Interstate Oil Compact Commission and independent operator. **Clarence Brehm,** Mount Ver-

83 Trouble-Free IH Engines

Work for North Texas Producer

JUST RIGHT FOR WRIGHT. Taking care of the dozen Hammon wells in the K.M.A. field near Wichita Falls is a trouble-free task with International power according to pumper W. T. Wright. He's shown alongside a U-4 engine that is in its fifth year on this pump jack without lost time for repairs.

"I can depend on Internationals to run and run without major repairs," says pumper. W. H. Hammon, Wichita Falls, independent oil producer, uses 83 International pumping engines on his wells.

Pumper W. T. Wright gives the low-down:

"I can depend on our U-1s, U-2s, U-4s, U-6s and even the old P-12s to run and run without major repairs. Many of the International engines have operated 18 to 24 hours a day for more than four years without overhaul . . . and they sure don't have a bit of trouble pulling the load."

Get the full International power story from your International Industrial Distributor, Power Unit Dealer or Oil Field Supply House. Find out how little it can cost you to pump your "allowable," with International "Power that Pays."

INTERNATIONAL HARVESTER COMPANY • CHICAGO 1

INTERNATIONAL IH INTERNATIONAL HARVESTER **POWER THAT PAYS**

PERSONALS

non, independent, was reappointed by the governor. The three retiring members are **Ivan G. Burrell,** Marshall; **James A. Matthews,** Centralia; and **Guy E. McGaughey,** Lawrenceville.

D. E. Hageman, Billings geologist, has been appointed a member of the newly organized Montana Oil and Gas Conservation Board by **Gov. J. Hugo Aronson.**

Vernon E. Holmes, formerly assistant division production superintendent for Sohio Petroleum Co., has been named division production superintendent at Houston. **Jesse L. George** has been appointed geologist for the Gulf Coast division at Houston. George formerly was Houston district geologist and Lafayette district geologist.

Donald M. Nace, of Socony-Vacuum Oil Co.'s research and development department, Paulsboro, N. J., has received the company's 1953 Incentive Fellowship, which entails a continuation of his salary while he seeks a Ph.D. in physical chemistry.

Frank Saye has been transferred from Elk City, Okla., to Oklahoma City as assistant production engineer for Shell Oil Co.

John S. Miller has resigned as Kansas district geologist for Champlin Refining Co. to become a partner in the firm of Graham - Messman-Rinehart Oil Co. He has headed the Wichita office the past 3½ years. He is a graduate of the University of Oklahoma and is working for his master's degree.

A. J. Smith, formerly a petroleum engineer for Panhandle Oil Corp. at Dallas, has been appointed to the same position for Colorado Oil & Gas Co. at Colorado Springs, Colo.

Carl E. Houghton has been appointed superintendent of the communications department of Peoples Natural Gas Co. He succeeds **C. D. Campbell,** who has retired.

Weldon Cartwright has been transferred from Houston to a new production office at Lafayette, La., as district geologist for Warren Petroleum Corp.

Edward Woozley, Boise, Idaho, farmer and currently state land commissioner, has been named by **Interior Secretary Douglas McKay** to be director of the Bureau of Land Management. Woozley will succeed **Marion Clawson,** whose resignation was requested by McKay and who was offered a new job in the bureau under the new director.

DEATHS

Gano Dunn, 82, president of the J. G. White Engineering Corp. since 1913, died April 10 in New York. Among the construction projects he directed were the U. S. Naval Oil Base at Pearl Harber and the first long-distance natural-gas pipe line in California.

Zeb Allen Dyer, 60, retired Brea district superintendent for Shell Oil Co., died April 6 in Los Angeles.

Thomas M. Rowan, 56, operator of Rowan & Argo Oil Drilling Co., died April 6 at his home in Long Beach. For several years he was drilling superintendent for Hancock Drilling Co.

Everett Dale Frazee, 50, driller for R. C. Patton Drilling Co., died April 7 at his home in Medicine Lodge, Kans.

Emmett R. Brann, 64, oil operator, died April 11 in Dallas following a short illness.

P. G. Fisher, 95, pioneer driller, died April 10 in Franklin, Pa.

W. A. Ingalls, 79, who formerly owned oil holdings near Shamrock, Sapulpa, and Bristow, Okla., died April 12 in Tulsa. He also formerly was an oil-lease broker and worked for Fred E. Cooper Co. prior to retiring about 10 years ago.

H. W. (Bert) Loy, 81, Chanute, Kans., independent drilling contractor, died April 9. He had been active in eastern Kansas drilling since 1901. He organized Loy Oil Co. in 1935 and became active in leasing in the western Kansas pools around Ellinwood. At the time of his death his interests were confined to water-flood developments in the Chanute area.

Willard M. Hall, 56, former director and member of the management committee of Creole Petroleum Corp., died in Winter Park, Fla., April 8. He was associated with Creole and other affiliates of Standard Oil Co. (N. J.) for more than 30 years. He retired from Creole in May 1951.

Archie B. Smith, 41, production supervisor for Stanolind Oil & Gas Co. at Spindletop field, was fatally injured in a rig accident near Beaumont, Tex., April 11.

Joseph H. Royer, Sr., 78, superintendent for Birch Oil Co. at Brea, Calif., died recently in Brea.

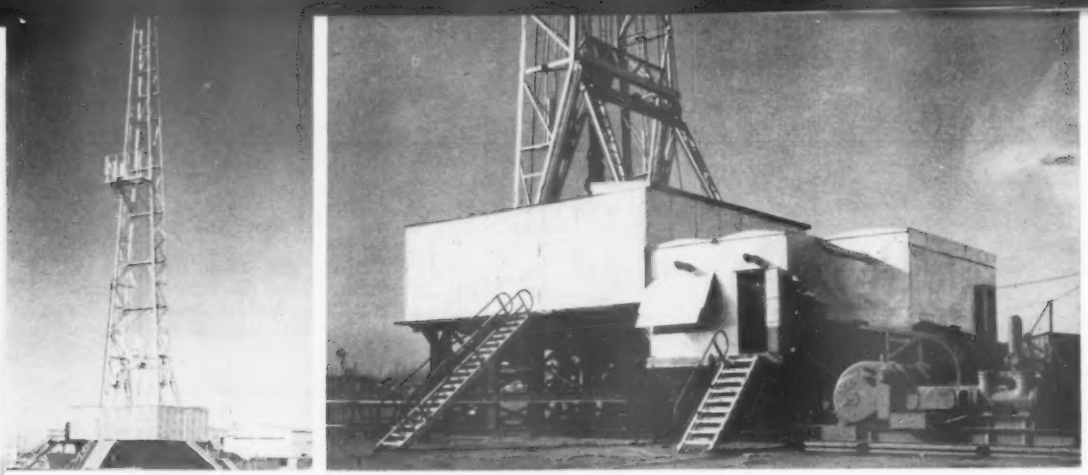
Frank James Downey, 62, Midland, Tex., independent operator, died April 8 in a Dallas hospital. He came to Texas 25 years ago as a drilling contractor and operated around San Antonio, Harlingen, Clarendon, and Fort Stockton. He was a founder of Smith & Downey Drilling Co. but sold his interest in the firm when he came to Midland to become an independent operator 18 years ago.

Elmer (Trim) Capshaw, chief engineer for the conservation department of the Oklahoma State Corporation Commission, died April 13 of a heart attack at his home in Norman, Okla. He was natural-gas engineer until his promotion recently to chief engineer.

Harry Loren Wilson, 80, drilling contractor, died April 11 in a Bartlesville, Okla., hospital. He was active in oil fields in northeastern Oklahoma until his retirement in 1926. He was a native of West Virginia and had been a Bartlesville resident since 1911.

F. R. (Bob) Bodien, 55, head of the Shell Oil Co. office in Centralia, Ill., died there April 11. He was transferred to Centralia from Tulsa 7 years ago.

D. A. Swarthout, 79, retired oil driller, died April 13 in Waco, Tex.



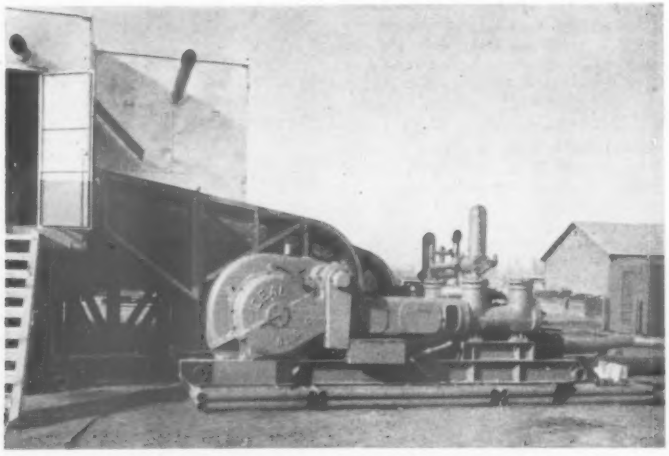
Curved roofs of individual sections of engine shed give Noble's rig an unusual appearance. Each of these sections moves with an engine, being permanently attached to the engine skid. All sections of the shelter around the rig floor are the same dimensions.

NOBLE CONVERSION

Contractor "Packages" Big Rig For Ease in Moving, Rigging Up

Prefabricated and interchangeable metal sections, elimination of wood from around the derrick, and mounting of all parts possible in the substructure are features of rig revamped by company personnel.

By Roy F. Carlson
West Texas District Editor



Small rollers (arrowed) position the mud pumps on the folding mat which is in turn positioned by jacks and pinned hinges so that the pumps are always in the same position relative to the substructure and pump drive.

PACKAGING of rigs for ease in moving and speed in rigging up is continuing, and is one of the most pronounced trends in improvement of drilling methods. New rigs, of course, are being rigged up originally in packages, and older equipment is being regrouped or revamped so that rapid moving is possible. One of this latter variety of rigs has been completed by Noble Drilling Co. in its oil-field yards. Some of the equipment is new.

Along with the many innovations incorporated into the rig, one of the more unusual features is that all work in revamping the rig and in construction of such units as the engine shed was done by Noble personnel in the firm's field shops. Constant improvement and continual changes in Noble's rigs are done in the shop, and keep shop personnel busy.

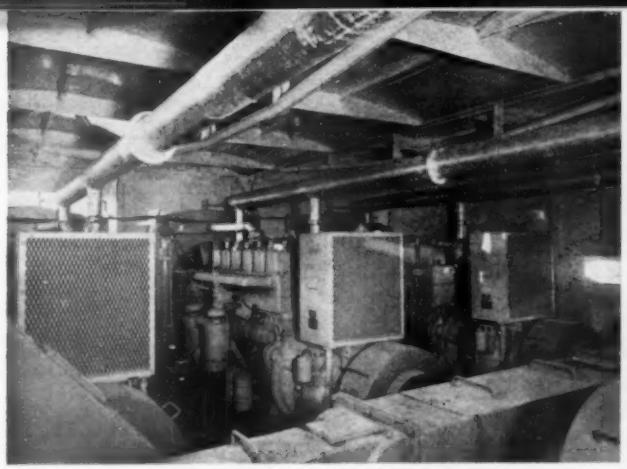
Engine House

Perhaps the most eye-catching feature of the Noble rig pictured here is the engine house and the fabricated metal shelter for the rig floor. Each of the engine skids supports a separate permanently mounted section of the engine-shed roof. These, when rigged up, fit closely together to make the engine-shed roof. The paneling around the engine house can be quickly removed during warm weather.

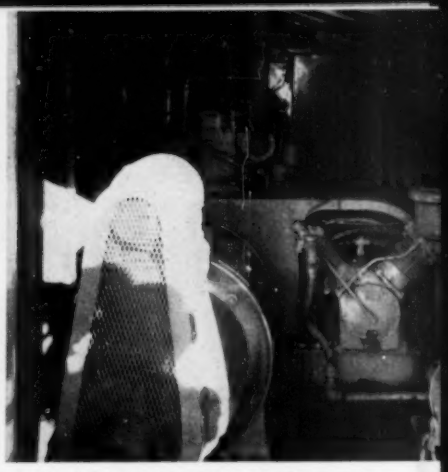
The walls around the derrick floor are formed of prefabricated metal sections, all of which are exactly the same size with bolt holes bored in the same position in all sections. Therefore, any section can be used at any place in the wall except for those that contain access doors.

Even the derrick man is protected by a metal shelter that is formed of prefabricated panels.

One of the primary ideas in design of the rig was the elimination of wood



Drilling engines are torque-converter equipped. Inside detail of engine-house roofs is also shown. The sections of roof are supported by posts at each corner, and a truss running the length of the section supports its weight on either side.



Inside view of auxiliary house, showing generator and auxiliary air compressor. Window opposite engine radiator provides engine ventilation.

from around the derrick. Toward this end, the substructure is floored with steel plating to eliminate use of matting boards.

To further cut down the use of wood, Noble designers devised a folding steel mat for use under the mud pumps. The parts of this mat are hinged so that they fold up during moves to legal load sizes. The mat is fastened to the substructure by pins and jacks so that it fits in the same position in relation to the substructure at all times.

The mat is fitted with roller pins that guide the position of the pumps laterally so that they, too, will be in the same position in relation to the substructure at each rigup. Jacks between the pumps and substructure adjust for belt tightness and belt alignment so each rigup is the same.

The only wood in use around the derrick is on the derrick floor under racked pipe. These timbers are placed in a pan-like arrangement that catches liquids draining from the pipes and diverts it off the derrick floor to some spot beneath the derrick. The pan and timbers are easily removable, and the timbers can be replaced easily.

Cat walks and ramps are all made of metal on this rig.

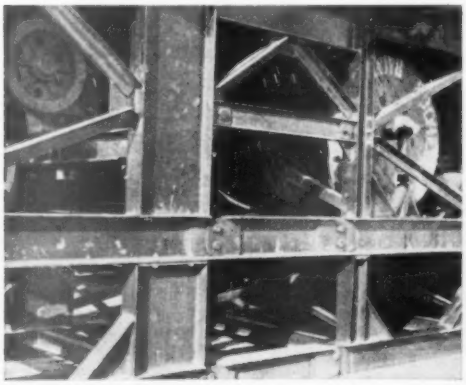
The rig is equipped with a 133-ft. mast and a 12-ft. substructure. The engine platform is stepped down 6 ft. from the derrick floor, placing the engines at a 6-ft. height. The wire-line anchor is placed inside the substructure directly under one of the derrick legs. A mounting for the wire-line reel is also built into the substructure behind the anchor for convenience in spooling off new line.

Insertion of the reel into the substructure is accomplished by removing a pair of beams from the side of the substructure and winching the reel into the substructure from truck-bed level. In this position, the line is easily unreeled when making a cutoff, and is always available, staying in the substructure during moves.

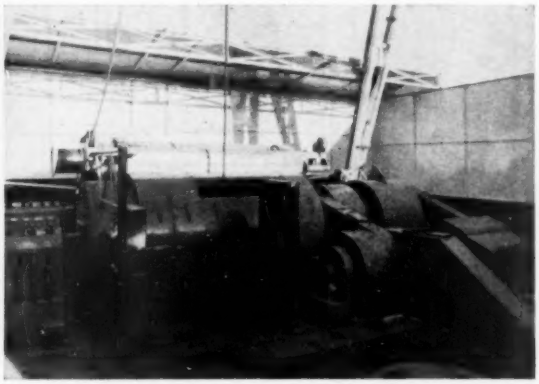
All air, water, and mud lines are built into the substructure and are so fitted with couplings and unions that sections will move with their respective part of the substructure. There will be a minimum of lines of any kind on the ground at a location. Air tanks, scrubbers, and other equipment are also mounted in the substructure if feasible. A compact and convenient mud house is built into the first mud-tank skid, along with the shale shaker. All facilities for measurement of mud properties are included in the mud house.

A part of the mud flow line is also permanently mounted in the skid.

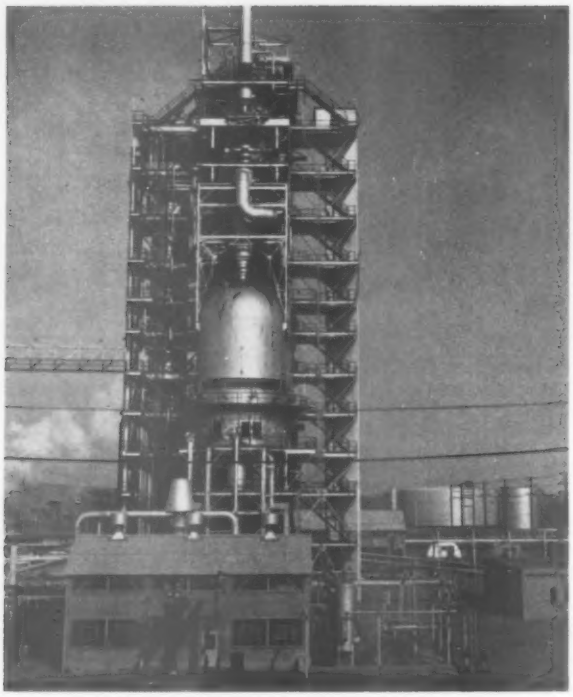
A large 100-kw. generator was converted by Noble personnel into a thyrite generator for rig lighting and other electrical purposes. This generator and the gas-engine prime mover are housed in a utility house that can be made nearly air tight if necessary.



The reel of drilling line shown moves with the substructure section within which it is located. Removal of the bracing shown at the side of the reel forms a window through which the reel may be moved into or out of position.



One of the first installations of a new feedoff control is shown at the right of the draw works. The rig is also fitted with an electric type of auxiliary brake. Interior of the prefabricated section around the derrick floor are also shown.



CATALYTIC CRACKING UNIT viewed from south, showing location of regenerator effluent flue-gas heat exchanger directly above regenerator. Regenerator air turboblower house is located in foreground.

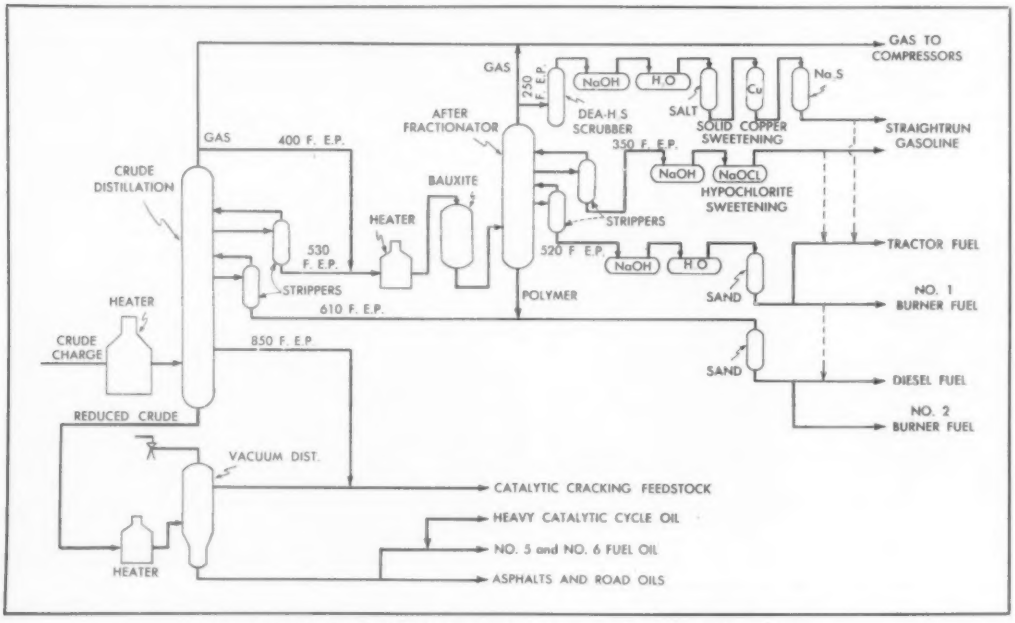
AFTER THREE YEARS . . .

How Present Operations Compare With Design Basis

at Carter's Billings Plant

THE refinery of Carter Oil Co., Billings, Mont., has been in operation 3 years. Construction of the plant was completed by Fluor Corp., Ltd., in July 1949. The process design was made by Universal Oil Products Co. The mechanical design was prepared by Fluor. Standard Oil Development Co. coordinated and checked the design and inspected construction of the refinery.

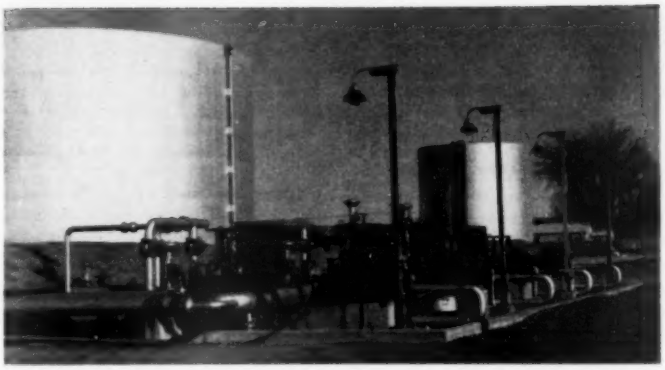
The actual design basis of the refinery was presented in The Oil and



SCHEMATIC FLOW DIAGRAM of crude and vacuum distillation sections. Fig. 1.

Gas Journal issue of June 23, 1949. This article will describe present operations and compare these operations with the original operating plans. Yields obtained by each plan are given.

The plant was designed to operate primarily on heavy Elk Basin crude received by pipe line from Wyoming. It actually runs 90 per cent heavy Elk Basin crude and 10 per cent other crudes such as Frannie, Oregon Basin, Big Wall, Cat Creek, etc. Oregon Basin crude is run in summer for the production of premium grades of penetration asphalts and road oils. Crude can be received into the refinery by tank car or truck in addition to the pipe line. Average yearly gravity of the crude run is 28.5° to 29.0° A.P.I., with a sulfur content of about 2.5 weight per cent.



TRANSFER-PUMP AREA illustrating pumps and motors used for continuous gasoline blending. Building in far right background houses the TEL weigh tank and addition equipment.

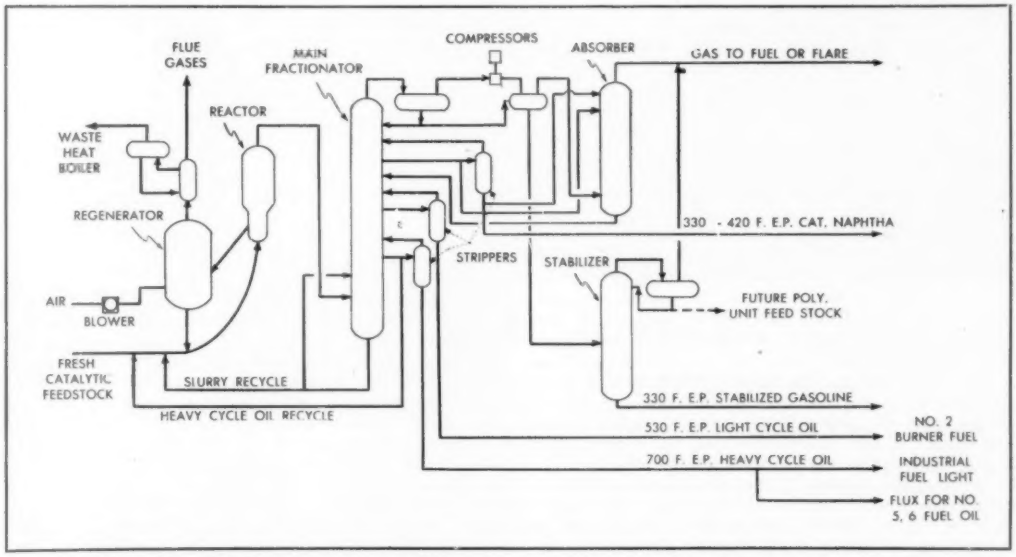
Process Description

The crude oil is pumped from receiving tankage to the crude unit area where it passes through conventional heat-exchange equipment and a large furnace into an atmospheric fractionating column. Coil outlet temperatures on this furnace vary from 680° F. on the road-oil operation to 750° F. on fuel-oil operation. The light gases from the fractionating tower are sent to the catalytic light-ends plant for processing. The overhead liquid and stripped first sidestream are recombined and heated in heat exchangers and a small furnace.

Then at a temperature of 700° to 770° F., the vapors pass through a drum containing bauxite for desulfurization. Desulfurized vapors are desuperheated and rerun in an afterfractionator. The H_2S and light gases are sent to the catalytic light-ends plant for processing. The overhead liquid stream and two stripped sidestreams are taken from this tower. The light overhead stream of approximately 250° F. e.b.p. is sent to treating where it is Girbotol treated, caustic washed, and solid copper treated to doctor-pass product. It is then sent to finished storage.

The first sidestream, a heavy virgin naphtha of approximately 250° to 350° F. boiling range, is caustic washed, hypochlorite sweetened, and sent to finished storage. The second sidestream, a light distillate, boiling range from 350° to 520° F., is caustic washed and sand filtered before being sent to finished storage. In addition to the above streams from this tower, approximately 300 bbl. per day of heavy polymer is drawn from the bottom of the tower. The straightrun naphtha comprises 17 to 20 per cent by volume on crude, and light distillate 13 to 18 per cent by volume. The overhead and first sidestream from this tower are used for gasoline blending. The second sidestream is used as No. 1 burner fuel, diesel base stock, and No. 2 burner stock.

The second sidestream from the atmospheric tower is stripped and sent to the treater for sand filtering, after which it is sent to storage for diesel



SCHEMATIC FLOW DIAGRAM of catalytic cracking, fractionation, and light-ends recovery sections. Fig. 2.

base stock. The boiling range of this sidestream is approximately 530° to 610° F. The third sidestream is unstripped and is sent to catalytic cracking feed-stock tankage. Reduced-crude bottoms from the main column are sent to vacuum unit heater where they are heated to 850° F. and flashed into the vacuum column.

No overhead cut on this tower is taken as the vacuum gas oil is condensed and withdrawn from the side of the tower and sent to catalytic cracking feed storage. The midsection sidestream is recirculated back to the furnace inlet to provide a wash above the flash zone. The pitch bottoms from the tower are automatically fluxed with heavy cycle gas oil by means of a viscosity control to specification grade fuel oil. Flow of this unit is illustrated in Fig. 1.

Equipment changes . . . The processing of heavier, higher-sulfur crudes has made it necessary to make several changes in the foregoing equipment both to minimize fuel yield and to provide satisfactory quality products. The crude-fractionating unit itself was not changed, but several changes were made in both the bauxite-treating operation and the vacuum-unit operation.

The bauxite unit was originally designed to handle all of the straightrun naphthas plus 20 per cent of the distillate stream. It was also designed to operate utilizing two bauxite drums in parallel. In order to meet the desirable sulfur level in both diesel fuel and No. 1 burner fuel, the entire gasoline stream plus 80 per cent of the distillate stream is desulfurized through this unit continuously, using only one drum. The other drum is regenerated using air and steam preheated in a small Petrochem furnace and then the drums are alternated.

The design desulfurization temperature was 770° to 850° F. Because of instability of products produced at this high temperature, the temperature was lowered to a range of 720° to 750° F. The original design called for the desulfurizer polymers to be recycled into the main crude tower. However, to improve the quality of desulfurized products, it is necessary to withdraw these polymers as fuel.

The original design called for a clay percolator on the naphtha and distillate streams from the desulfurization unit. The purpose of the fuller's earth used in this vessel was to stabilize the color of the products produced. This percolator has never operated satisfactorily as a color stabilizer and is not currently in use. Color of sidestreams is controlled by undercutting and dropping the heavier color material into the polymer bottoms.

Due to the large amount of hydrogen sulfide produced by this operation, it has been necessary to replace the carbon steel inlet transfer piping and outlet piping to the afterfractionator with 6 per cent chrome piping.

Vacuum unit modified . . . Because of the heavier crudes charged to the crude unit, it has been necessary to make several changes in the vacuum unit. The vacuum-unit furnace transfer temperature has been increased from 800° to 850° F. The screens in the top of the vacuum tower which were designed to eliminate entrainment were removed because of excessive maintenance and unsatisfactory performance. A cold pitch quench is recirculated to the vacuum-tower bottom to reduce the temperature and therefore decrease the amount of cracking that occurs in the bottom of the vacuum tower. These changes permit the production of pitch with a zero penetration at 77° F. when desirable.

Minor changes in the treating unit area for the processing of the straightrun products included a hypochlorite sweetening system on the heavy straightrun naphtha, and the addition of a metal deactivator system in order that a small amount of metal deactivator could be added to the light straightrun naphtha and light distillate stream.

Table 1 summarizes the design yields and those actually being maintained at the present time.

Cat cracker . . . The fluid catalytic cracking unit is of the standard Universal Oil Products Co. design. It has some unusual features such as the upside-down relation of the reactor and regenerator, that is, the regenerator is located below the reactor in the structure. This position was chosen to produce a counterflow of catalyst and regeneration air. It also permits a higher regeneration pressure which allows the use of a smaller regenerator and decreases catalyst losses. The unit does not have a slurry settler or a Cottrell precipitator. The regenerator has three sets of three-stage cyclone separators, and it is lined with a ceramic monolithic-type lining.

The unit was designed to process 10,000 bbl. per stream day of atmospheric heavy gas oil and vacuum gas oil. The combined feed of 23.5° A.P.I. gravity and 35 diesel index was to be cracked to 56 per cent 430 conversion. Design catalyst circulation rate was 12 tons per minute; catalyst oil weight ratio, 13.3 per hour. A synthetic silica alumina catalyst was to be used. The unit presently processes a 20.0° to 22.0° A.P.I. 34.0 diesel index, combined gas-oil stream to 70 per cent conversion. Severity to date has been maintained by low reactor temperature, high holdup, low catalyst-oil ratios, and high recycle rate.

Ground silica alumina catalyst is used. Regeneration temperatures average 1,150° F. and reactor temperature averages 900° F. From 50 to 70 per cent by volume on fresh feed of the third sidestream is recycled. Slurry is recycled to extinction.

TABLE 1

	Design	Actual
Crude run, bbl. per stream day	22,000	22,000 to 25,000
Crude, °A.P.I.	30.8	28.5 to 29.0
Sulfur, weight per cent	2.0	2.5
Dry gas, weight per cent	0.8	1.0
Gasoline, volume per cent	28.6	20.5
Distillate and L.G.O., volume per cent	22.2	28.0
Heavy gas oil and V.G.O., volume per cent	35.9	37.5
Bottoms, volume per cent	12.5	13.0
Total	100.0	100.0

The refinery is running a heavier, higher-sulfur crude than design. The bottoms figures include penetration-grade pitch used for road-oil production. Although a lower gasoline yield is obtained from the heavier crude, the same bottoms product is being produced by operating the vacuum unit at a higher temperature. This operation produces a larger vacuum gas-oil yield of a satisfactory quality for cracking feed. In addition, all the products produced for sale, such as gasoline, No. 1 burner fuel, diesel fuel, and No. 2 burner fuel are of a higher quality than the original design provided for.

Cat cracker fractionator . . . The catalytic unit fractionator produces an overhead liquid and gas stream and three steam-stripped sidestreams. The overhead stream is a 40° to 330° F. distillate. The first sidestream is 330° to 420° F. heavy cracked naphtha; the second sidestream is 420° to 530° F. light heating oil; and a third sidestream is 530° to 700° F. heavy cycle oil. Gases from the crude unit, desulfurization unit, and cracking unit are compressed in two single-stage gas-en-

for in or out bulk liquid storage

In 5 great markets General American offers you complete bulk liquid storage terminal facilities with no capital investment on your part.

You use modern facilities, pipelines, manifolds, blending equipment.

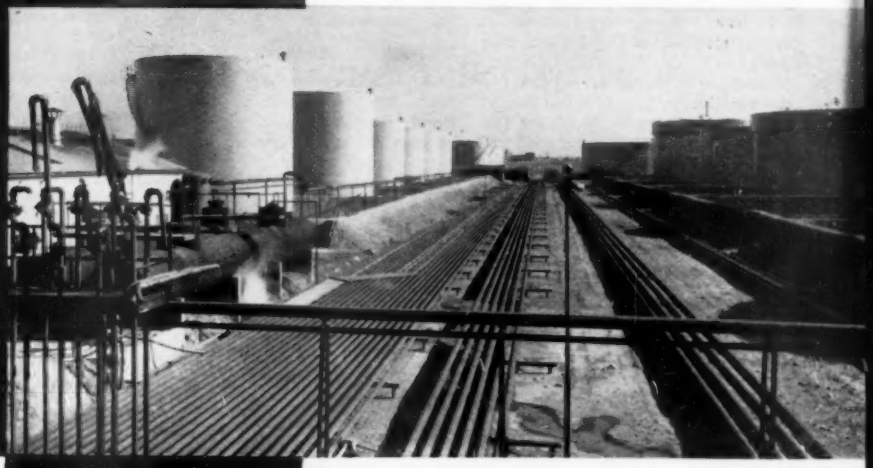
You have complete privacy.

All methods of bulk liquid transportation available.

At the Ports of New York and New Orleans there is high-speed canning, drumming and barrelling equipment—yours to use.

use General American's "for lease" facilities at Chicago

The Chicago region is a natural center for all types of transportation. Last year alone, the Chicago industrial area received and shipped a total of 46,198,867 tons of water-borne cargo. Via tanker alone, 3.9 million lb. of bulk liquids are exported every month. Tank cars, too, move tremendous quantities of bulk liquids in and out of this giant rail center.



TANK STORAGE TERMINALS GENERAL AMERICAN TRADE MARK

for dependability, see GENERAL AMERICAN

5 TANK STORAGE TERMINALS

in Important Marketing Centers

- Port of New York (Carteret, N. J.)
- Port of New Orleans (Goodhope, La.)
- Chicago
- Houston
- Corpus Christi

GENERAL AMERICAN TANK STORAGE TERMINALS

a division of **General American Transportation Corporation**
135 South La Salle Street, Chicago 90, Illinois

gine-driven compressors to 60 psig. This stream is then contacted with the catalytic overhead stream, cooled, and flashed into the compressor discharge drum.

Overhead vapors from this drum are fed to an absorber where they are contacted with a heavy cracked naphtha lean oil. The rich oil from the absorber is returned to the catalytic cracking fractionator. The gas from the absorber is sent to the fuel-gas system. The liquid from the compressor discharge drum is fed to a 225-psig. stabilizer. The gas from the stabilizer is sent to the fuel gas system and the stabilized gasoline to the treater where it is caustic washed, hypochlorite sweetened, inhibited, and sent on to finished storage.

The first sidestream from the catalytic cracking fractionator is split into two separate streams. One of these streams is stripped and sent to treating and the other is sent to the absorber as lean oil. A portion of the stripped naphtha is also used as lean oil. The heavy-naphtha production is two-stage caustic washed, and inhibited before being sent to storage. The second sidestream is stripped and sent to treating for use in burner fuels or sent untreated to storage for use as fuel flux. The treating step includes a caustic wash, sand filter, and clay filter.

The third sidestream is split into two separate streams. One of these streams is stripped and sent to storage for fuel flux stock; the other is unstripped and recycled back to the reactor. The tower bottoms, a heavy slurry containing 0.2 lb. of catalyst per gallon is recycled back to the reactor. The flow of the catalytic unit and light-ends plant is shown in Fig. 2. Design operation and yields as well as present operating conditions and yields are compared in Table 2.

As shown by Table 2, the unit is operating at a lower severity per pass, but is recycling to obtain desired conversion and product distribution. This method of operation reduces gas make and increases gasoline yield with a slight debit due to the higher carbon make. When a polymerization unit, now under construction, is completed, higher reactor temperatures will be used to increase severity because the additional gas made can then be converted to gasoline.

The catalytic cracking plant has been changed only slightly from the original design. A recycle line from the heavy-cycle-oil drawoff to the reactor injector was installed to permit a higher recycle operation. A waste-heat boiler was installed on the flue gases from the regenerator. This boiler produces 20,000 lb. per hour of 90-psig. steam. The reactor grid was raised 17 ft. to allow a low holdup operation while running silica magnesia catalyst; however, it is expected that this grid will be lowered to its previous location.

The unit on October 4, 1952, completed a 720-day run and after this long run was found in good condition.

Utilities

Approximately 12,000 to 15,000 g.p.m. of water is taken by three electrically driven deep-well pumps directly from the Yellowstone River to supply all requirements. In addition, two gas-driven pumps have been installed to supply emergency water for fire fighting. In the winter, the river water has a temperature of 32° to 35° F. It is necessary to recycle a portion of the hot, used cooling water to prevent formation of needle ice in the water lines. Effluent returned to the river passes through an A.P.I. separator and has met all local and state antipolution requirements.

After the plant began operations, it was necessary to replace the 18-in. tempering water line made of preformed concrete pipe with transite, because of mechanical failure. Flight scrapers were also installed in both the clean and dirty water separators for removal of the oil sand sludge which accumulates in the bottom of the settling basins.

Because of the high solids concentration and foreign material present in the river water during the high spring runoff, a settling basin has been installed to be used during the spring and summer months. This settling basin will settle out all the sand, silt, and extraneous material before the water enters the main pump basin.

The refinery depends on purchased electric power for all of its power requirements. In case of a power failure, a 30,000-bbl. tank and a 5,000-g.p.m. turbine-driven pump are provided at the boiler house to supply emergency cooling water for approximately 1 hour. For this reason, every vital motor-driven pump in the refinery, with the exception of the cooling-water pumps, is spared with steam turbines. In addition, pumps handling heavy products are steam traced for winter operation. All pumps, instruments, etc., are placed outdoors. This arrangement has been entirely satisfactory even though the refinery has experienced some rather cold winters.

Steam system . . . There are four boilers rated at 42,000 lb. each, of 415-psig. 625° F. steam. Only the firing line is within the boiler house, which also houses feed-water-treating facilities. The original plant design utilized hot lime soda treated and filtered water as a source of supply for refinery drinking water. After cooling, commercial calcium hypochlorite was added to maintain a chlorine residual from 0.1 to 0.2 p.p.m. This produced a potable water with a distinct chlorine taste and a rather high pH (10.2-10.5) for human consumption. An activated charcoal filter was added to improve the taste and CO_2 injection was initiated for pH control.

The original water-treating facilities consisted of a Permutit type hot process lime soda softener, followed by anthracite filters, and a deaerating feedwater heater. River-water hardness varies from 150-300 p.p.m.; treated-water hardness averages 5-20 p.p.m.

(Continued on page 159)

TABLE 2

	Design	Actual
Feed stock:		
°A.P.I.	23.5	20.0-22.0
Diesel index	36.0	34-35
Ash, lb. per 1,000 bbl.	0-2	0-2
Bbl. per stream day	10,000	9,200
Total feed, bbl. per stream day	10,385	14,000
Operating conditions:		
Regenerator temperature, °F.	1,125	1,150
Reactor temperature, °F.	950	900
Space velocity, W/hr./W	1.0	1.4
C/O ratio	13.3	8-10
Circulation rate, T/N	12.0	12-14
Regenerator pressure, psig.	18.0	18.0
Reactor pressure, psig.	9.0	11.0
Carbon on regenerator catalyst, weight per cent	0.7-0.8	0.2-0.3
Carbon burning rate, lb. per hour	6,700	10,500
Catalyst losses, T/D	2.4	1.5
Flue gas—(excess O_2), volume per cent	2.0-3.0	0.2-0.5
Yields:		
Dry gas H_2, C_1-C_2, H_2S, weight per cent	8.3	11.0
C_3+ total, volume per cent	12.5	13.0
C_5-420° F., volume per cent	40.0	47.5
420°-530° F., volume per cent	11.0	7.5
530° F. + volume per cent	33.0	22.5
Carbon	5.0	8.2
Coke	5.6	9.1
Conversion, 430+	56.0	70.0

PELTON *here's where long stroke hydraulic pumping belongs*

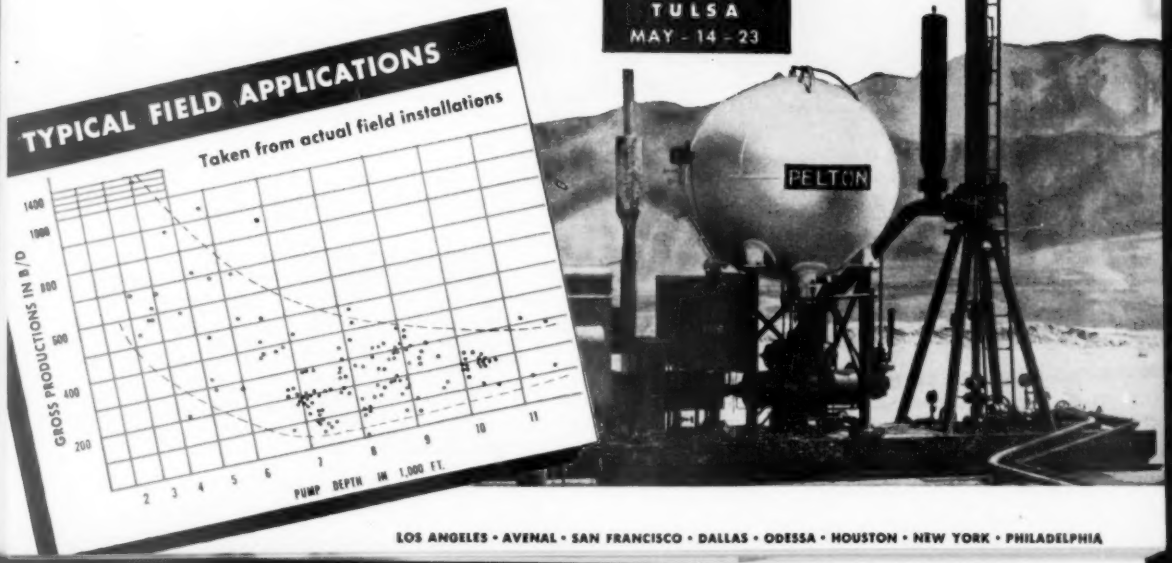
The economics in favor of Long Stroke Hydraulic pumping are most outstanding where pumping loads are heavy. Wherever oil potential is great, deep wells or shallow wells, Pelton Long Stroke Units pay off quickly. THE REASON: Effective stroke at the bottom hole pump after rod stretch permits use of a pump barrel 10 to 30 ft. in length. Long, slow strokes reduce fluid velocity through the standing valve resulting in higher volumetric efficiency. This aids in handling gassy or sandy fluids. Soft rod reversals prolong sucker rod life 6 to 8 times.

Check the application chart below. If your wells fit somewhere within the pattern shown, you will find Pelton Long Stroke Hydraulic Pump Jacks the real answer to more oil at less pumping cost.

Send for our application data sheet on which you can give us the well information necessary to determine the correct model and price of a Pelton Unit for your job—no obligation whatever.

THE PELTON WATER WHEEL COMPANY *Subsidiary of Baldwin-Lima-Hamilton Corp.*
OIL INDUSTRY MACHINERY DIVISION
2447 East 54th Street, Los Angeles 58, California

SEE PELTON UNIT IN OPERATION
OIL SHOW
TULSA
MAY - 14 - 23



LOS ANGELES • AVENAL • SAN FRANCISCO • DALLAS • ODESSA • HOUSTON • NEW YORK • PHILADELPHIA

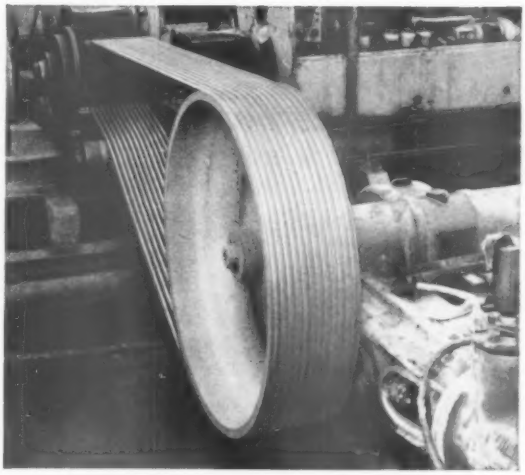
They can thank

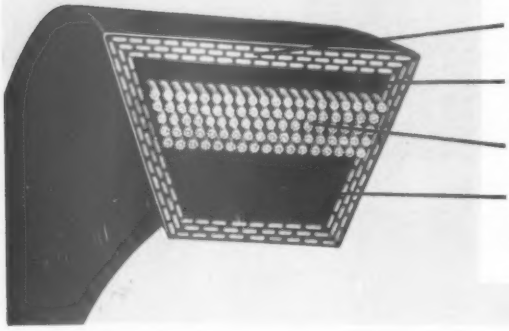
Preventive Maintenance

...for continuous performance like this!

Day after day, around the clock, these 12 Dayton Thorobred V-Belts deliver full Diesel power to this rotary drilling rig in an Illinois oil field. Such drives, exposed to rain, snow, ice, dust and boiling sun, have to be rugged to stand up. Failure of the drive, as you know, can be very costly.

That's why it is sound preventive maintenance to make sure that all the drives on drilling rigs and other field machinery are belted with dependable Dayton Thorobred V-Belts. They're *famous* in tough oil field usage. Why? Look at the *exclusive* construction features used by the makers of the *first* V-Belt, the *first* rubber-bonded rayon cords, the *first* really *oil-proof* belt. Get the facts about them . . . then get Dayton Thorobred V-Belts for *your* rig!





All-Weather Cover, of "Hi-Twist" fabric, rubber-impregnated and bias-cut for maximum flexibility and wear.

Exclusive Dayton 327-V blend, natural and synthetic rubbers, for easy stretch with instant recovery in tension section.

Thoro-Bonded Rayon Cords, with each filament actually rubber-coated, for greatest tensile strength and flexibility.

Exclusive Dayton 812-V Compound, in compression section, for perfect crosswise rigidity, greatest flexibility, greater strength, longer life.

Dayton Rubber

Since 1905

World's Largest Manufacturer of V-Belts

DAYTON RUBBER COMPANY • DAYTON 1, OHIO

For Dayton Service, just call your Dayton Distributor (see "Belting" in the classified section). He can supply you from convenient warehouse stock, give you expert drive advice, bring in a Dayton staff engineer for the really *tough* problems!

©D. R. 1953

The Authors Say . . .

1 Laboratory data and extensive field experience show that the properties of cements containing bentonite are satisfactory for use in wells with formation temperatures ranging from about 100° to 250° F. Cements containing 8 to 12 per cent bentonite have been used successfully in several thousand wells during the past 4 years.

2 Good results in the placement and the performance of regular portland cements containing 8 to 12 per cent bentonite have been obtained in wells with formation temperature of about 100° to 250° F. by varying the amount of calcium lignosulfonate used in accordance with the following schedule.

Approximate depth of wells, feet	Amount of calcium lignosulfonate added, weight, per cent of cement
4,000 or less	0.00 to 0.30
4,000 to 7,000	0.30 to 0.50
7,000 to 10,000	0.50 to 0.60
10,000 to 13,000	0.60 to 0.75

3 The low density of slurries prepared from cements containing 8 to 12 per cent bentonite is advantageous in the primary cementing of casing through zones in which there is danger of losing circulation. The successful use of slurries weighing 12.5 to 14 lb. per gallon to place cement columns 2,000 to 4,000 ft. above the bottom of the casing on the primary cement job has eliminated the time and expense of stage cementing in many areas.

4 The low set strength of cements containing bentonite is beneficial in obtaining good penetration by perforators and in preventing loss of seal resulting from shattering of the cement upon perforation. This property has been particularly advantageous in obtaining production through perforations in small liners set in large-diameter holes.

5 Recent experimental work indicates that the use of modified cement slurries might be helpful in obtaining better squeeze-cementing results.

6 A saving of 15 to 25 per cent on the cost of cementing materials for a given job is effected by the use of cements containing bentonite, as compared with the cost of cements containing no bentonite.

7 High percentages of bentonite (10 to 12 per cent) should not be added to slow-setting cements for use in deep wells unless laboratory tests have been made and show that the cement-bentonite mixtures have sufficient thickening time for placement under the well conditions to be encountered. Inasmuch as the thickening times of slow-setting cements containing bentonite vary considerably from brand to brand, it is advisable to obtain thickening-time data on the particular brand of slow-setting cement under consideration before bentonite is added for field use.

New Developments in the Use of

BENTONITE IN CEMENTS

by B. E. Morgan* and G. K. Dumbauld*

USE of bentonite in cements has increased rapidly during the past 4 years. Cements containing 8 to 12 per cent bentonite have been used successfully in several thousand wells in which formation temperatures varied from about 100° to 250° F.

Good results in the placement and performance of cements containing bentonite have been obtained by controlling the setting properties of regular portland cements through the use of calcium lignosulfonate in concentrations from 0 to 0.75 per cent.

Laboratory and field experience shows that the following properties of cements containing 8 to 12 per cent bentonite are advantageous in the cementing of many wells: (1) low slurry density of 12.5 to 14 lb. per gal.; (2) low water loss of about 100 cc. in a 30-minute A.P.I. filtration test; and (3) low set strength of about 200 to 250 psi. tensile.

A savings of about 15 to 25 per cent in the cost of cementing materials for a given job is realized through the use of cements containing 8 to 12 per cent bentonite in preference to cements containing no bentonite. An additional saving is realized in many areas because the time and expense of performing stage jobs are eliminated by the use of light-weight slurries prepared with cements containing 8 to 12 per cent bentonite.

For several years, the use of small amounts of bentonite with cements has been practiced primarily to increase the consistency of cement slurries. These low-bentonite content cements produced stable slurries weighing about 14½ lb. per gallon and developing set strength of about 400 psi. tensile. Further reductions in density and set strength were needed for many jobs, but the addition of more than about 4 per cent bentonite was generally considered to be unwise prior to about 1948.

Work done primarily to obtain improved perforating properties in set cements resulted in the development of a composition which is prepared by the addition of bentonite and calcium lignosulfonate to cement.[1] The properties of a cementing composition containing 12 to 15 lb. bentonite and 0.5 lb. calcium lignosulfonate per sack of cement, and the results obtained on the first few experimental field jobs were discussed in a paper presented in 1950.[2]

*Authors with Humble Oil & Refining Co., Houston, Tex. Portion of paper presented at spring meeting, A.P.I. Southwestern District, Division of Production, Fort Worth, March 4-6, 1953.

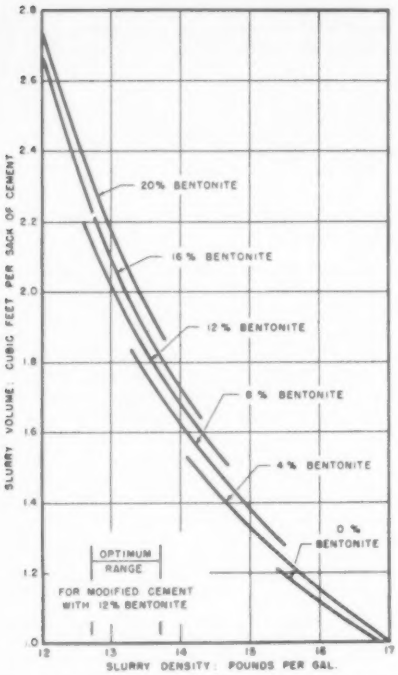


Fig. 1—Relation between density and volume of cement slurries containing bentonite.

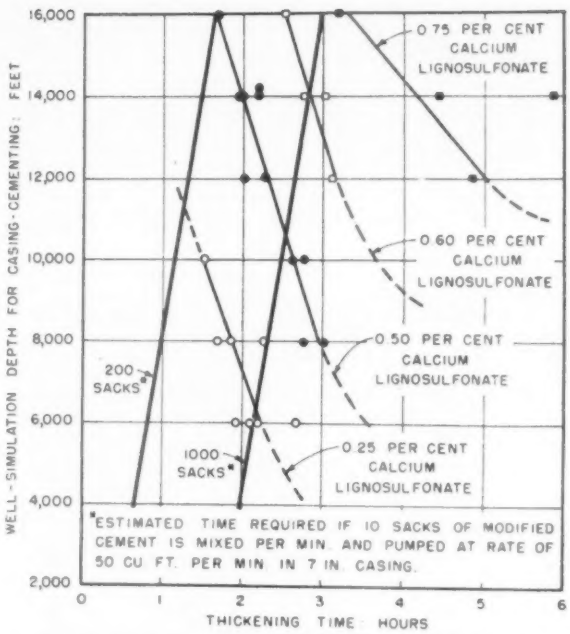

WELL-SIMULATION DEPTH FOR CASING-CEMENTING: FEET
0.75 PER CENT CALCIUM LIGNOSULFONATE
0.60 PER CENT CALCIUM LIGNOSULFONATE
0.50 PER CENT CALCIUM LIGNOSULFONATE
0.25 PER CENT CALCIUM LIGNOSULFONATE
200 SACKS*
1000 SACKS*
*ESTIMATED TIME REQUIRED IF 10 SACKS OF MODIFIED CEMENT IS MIXED PER MIN. AND PUMPED AT RATE OF 50 CU. FT. PER MIN. IN 7 IN. CASING.
THICKENING TIME: HOURS

Fig. 2—Thickening times of modified cement slurries. NOTE: Regular portland cements 12 or 16 per cent bentonite and various percentages of calcium lignosulfonate, mixed to slurry densities of 13.4 or 13.8 lb. per gallon.

Since then, cementing compositions containing bentonite and calcium lignosulfonate have been used extensively in operations of Humble Oil & Refining Co. and rather generally throughout the industry. These cementing compositions are commonly referred to as "modified cements."

Other investigators[3,4,5] have shown that light-weight slurries satisfactory for cementing many wells may be produced by the addition of bentonite to conventional cements without the use of a dispersant and retarder such as calcium lignosulfonate; and cements containing bentonite alone have also found widespread use throughout the industry.

Cost . . . The materials, including the handling and blending charges, to prepare a given volume of modified cement slurry cost about 15 to 25 per cent less than that of cement to

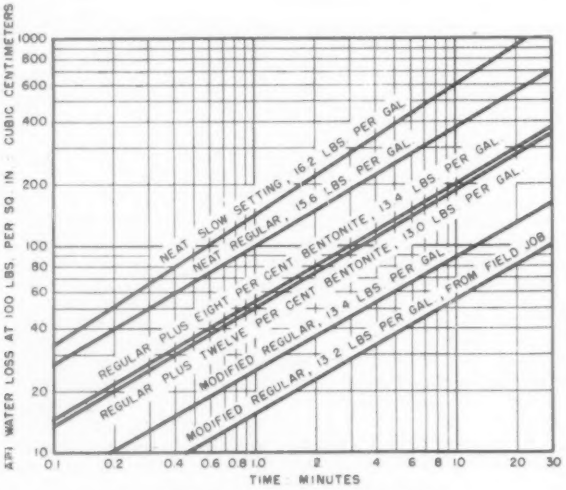

API WATER LOSS AT 100 LBS. PER SQ. IN.: CUBIC CENTIMETERS
NEAT, SLOW SETTING, 16.2 LBS. PER GAL.
NEAT REGULAR, 15.6 LBS. PER GAL.
REGULAR PLUS EIGHT PER CENT BENTONITE, 13.4 LBS. PER GAL.
REGULAR PLUS TWELVE PER CENT BENTONITE, 13.0 LBS. PER GAL.
MODIFIED REGULAR, 13.4 LBS. PER GAL.
MODIFIED REGULAR, 13.2 LBS. PER GAL., FROM FIELD JOB
TIME: MINUTES

Fig. 3—Filtration properties of cement slurries.

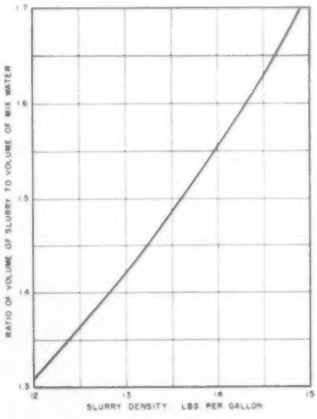


Fig. 4—Relation between density of cement slurries and volume of slurry per volume of mix water.

RIG TIME SAVED IS DOLLARS SAVED
CALL WELEX AND BE SURE

You side-step trouble and delays when you call on Welex for casing perforating and open hole shooting. The Welex crew arrives at your location equipped and ready to finish the job on schedule. A pick-up truck loaded with extra guns, jet charges, and auxiliary equipment goes with the Welex perforating unit on every job. Every Welex perforating truck is equipped with a stand-by power plant ready instantly in the event of trouble in the regular power generator. Always ready with the right equipment for the job is one of the important Welex extras that help make sure results cost less with Welex jets. It pays to call Welex for prompt service, day or night.

ORIGINATORS OF Welex JET PERFORATING

"Call Welex and be SURE"

Welex

JET SERVICES INC.

General Offices: 3909 Hemphill St.
Fort Worth 10, Texas

"Throughout the industry, a trend toward use of bentonite . . . is noted."

prepare the same volume of neat-cement slurry.

Calculations

Typical calculations for a primary cementing job using cement containing bentonite are illustrated in the following steps and example.

1. Knowing the diameter of the hole, size of the casing, and height of cement column desired in the annulus, the volume is calculated in the usual manner. Allow safety margin for enlarged hole according to field experience (10 to 50 per cent is common practice). For this example, assume 1,000 cu. ft. of slurry is needed.

2. Decide slurry density to be used. Laboratory data and field experience indicate the optimum density for light-weight cement slurries containing bentonite is between about 12.7 and 13.7 lb. per gallon. For this example, assume a density of 13.2 lb. per gallon.

3. Determine the bentonite content to be used. Data by Smith[4] show that about 8 to 12 per cent bentonite is needed for this slurry density. About 12 per cent bentonite produces a satisfactory modified cement slurry. Assume the bentonite concentration to be 12 per cent.

4. Determine the volume of slurry produced per sack of cement. Fig. 1 may be used to obtain this information. For a slurry weighing 13.2 lb. per gallon and containing 12 per cent bentonite, 1.94 cu. ft. of slurry volume is obtained per sack of cement.

5. Divide the slurry volume needed by the volume of slurry produced per sack of cement to obtain the number of sacks of cement needed; hence, $1{,}000 \div 1.94 = 515$ sacks.

6. Calculate amount of bentonite needed: $515 \times 94 \times 0.12 = 5{,}800$ lb. or 58 sacks.

7. If calcium lignosulfonate is used, calculate the amount needed. Reference to the data in Fig. 2 and to the foregoing discussion on thickening time may be helpful in making this decision. For this example, assume 0.5 per cent of calcium lignosulfonate is needed; therefore, $515 \times 94 \times 0.005 = 242$ lb.

For certain cementing operations, i. e., liner and squeeze jobs, a method to determine the volume of cement slurry to be mixed is needed. This may be accomplished through the use of the data in Fig. 4, if the slurry density is known and the volume of mix water is measured. For example, assume 10 bbl. of slurry weighing 13.2 lb. per gas is needed. Reference to the data in Fig. 4 shows that 1 volume of mix water produces 1.44 volumes of cement slurry weighing 13.2 lb. per gal.; hence, $10 \div 1.44 = 6.95$ bbl. of mix water needed.

Dry mixing . . . Bentonite is blended with dry cement at bulk-cement plants as the cement is transferred from railroad cars or from bulk storage to trucks. When calcium lignosulfonate is used, it is added along with the bentonite. In Humble's operations no failure has been attributed to poor dry mixing, but some evidence that the bentonite content has varied slightly from job to job has been noted. During the early use of modified cement, the dry mixing was supervised closely in order to be sure that a uniform mixture was obtained.

Better dry mixing is being obtained now with less supervision because better mechanical facilities for mixing high percentages of additives to cements have been installed at most of the bulk-cement plants. Also, experience gained by personnel at the bulk plants has helped.

Field Experience, Using Bentonite

Use of cements containing 8 to 12 per cent bentonite has increased steadily during the past few years. For example, in Humble's operations, 8 jobs in 1949, 70 jobs in 1950, and 220 jobs during the first 6 months of 1951 used modified cements containing approximately 12 per cent bentonite and 0.3 to 0.75 per cent calcium lignosulfonate. Since then, modified cement has been used on a routine basis throughout the company's operations. It is estimated that modified cement was used on about 800 jobs in 1951 and on about 1,200 jobs in 1952. In addition, a significant number of jobs were done in shallow, low-temperature wells with regular portland cement containing about 8 per cent bentonite.

Throughout the indusiry, a trend toward use of more bentonite in cements has been noted. A survey of practices in West Texas during the latter part of 1951 showed that all of 16 operators who were contacted were using bentonite in cement for surface casing and that 11 of the 16 were using bentonite in cement for production casing.[5] Most operators were using small amounts of bentonite (2 to 4 per cent), but 4 of the 16 were using between 8 and 12.5 per cent bentonite. Surveys during 1950 and 1951 by the A.P.I. Southwestern District Study Committee on Primary Cementing[6,7] indicated that many operators were adding bentonite to cement.

The primary cementing of surface casing, intermediate casing, and production casing has been done with very successful results using cements containing 8 to 12 per cent bentonite. Also, good results in the cementing of liners have been obtained. Typical field jobs of primary cementing and cementing of liners have been discussed previously.[2]

A few squeeze jobs using modified cements were done three or four years ago and the results, which were not very encouraging, have been reported previously.[2] Recent experimental work done in connection with a new method of well completions[8] indicates that the use of modified cement slurries may offer a possible way to obtain better squeeze-cementing results. In the new well-completion method, it is desirable to be able to place an extension pipe below existing perforations in a well, squeeze cement slurry into the perforations to seal them, then reverse out the excess slurry to leave the inside of the casing opposite the perforations open so that the same interval can be reperforated.

Results of surface tests indicated that conventional cement slurries would form a tight bridge of cement filter cake in the annular space between the extension pipe and the perforated section of casing, thereby making it impossible to reverse out after squeezing. In similar surface tests using modified cement slurries, cement cake formed in the perforations and inside the casing immediately around each perforation, but the slurry retained sufficent fluidity to be reversed out easily.

One experimental field job in which the extension pipe was placed through perforations from 7,110 to 7,118 ft. and extended 4 ft. below the bottom perforation has been done. In order to get the desired surface squeeze pressure of 3,300 psi., pumping was stopped several times for intervals of 2 to 5 minutes near the end of the squeeze job. The excess cement slurry was reversed out easily. After the cement had set, a tubing-type perforator was lowered into the well and the interval which had been squeezed from 7,110 to 7,118 ft. was reperforated without difficulty. Future experimental field work on this technique for squeezing is planned.

References

1. U. S. Patent 2,582,459, R. A. Salathiel, assigned to Standard Oil Development Co., Elizabeth, N. J.

2. Morgan, B. E., and Dumbauld, G. K.: "A Modified Low-Strength Cement," Trans. A.I.M.E., (1951), Vol. 192, pp. 165-170.

3. Mallinger, M. A.: "Some Controlling Factors Regarding Variable Weighting of Cement Slurries," Journal of Petroleum Technology, (Dec., 1950), Sec. 1, pp. 10-11 and Sec. 2, p. 5.

4. Smith, Dwight K.: "Physical Properties of Gel-Cement," The Petroleum Engineer, (April, 1951), pp. B-7-B-14.

5. Saunders, C. D., and Nussbaumer, F. W.: "Trends in Oil-Well Cementing Materials," presented at A.P.I. Mid-Continent District spring meeting, Wichita, Kans., March 19-21, 1952.

6. Davis, Louis F.: "Results of Survey on Primary Cementing Practices," Drilling and Production Practice, (1951), pp. 191-204.

7. Webber, Jack C.: "A Report on Gel Cementing," Drilling and Production Practice, 21 (1952) (in press).

8. Huber, T. A., and Tausch, G. H.: "Permanent-Type Well Completion," Trans. A.I.M.E., (1953), Vol. 198, pp. 11-16.

WITH A PRODUCER AT STAKE...
A WALL WHERE YOU NEED IT MOST ...AND NOW
HERE'S WHERE YOU NEED and USE SEAL FLAKES
50 LBS. NET
SEAL FLAKES
PRODUCED BY
LOUIS, MO.

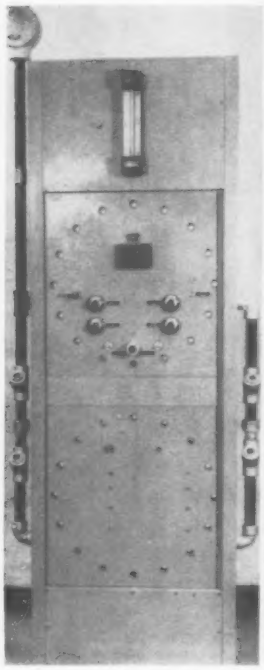
When you're sitting on a potential producer and run into a thief porosity, you want the best lost circulation material . . . SEAL FLAKES. They are made to the highest standards, will retain their strength, do not ball up, form a strong, positive seal, completely inert, do not affect drilling fluids, absorb absolutely no water, handle easily, mix fast and pump through the circulation equipment freely.

When you are in lost circulation difficulties, there's no surer solution than the original and best — SEAL FLAKES.

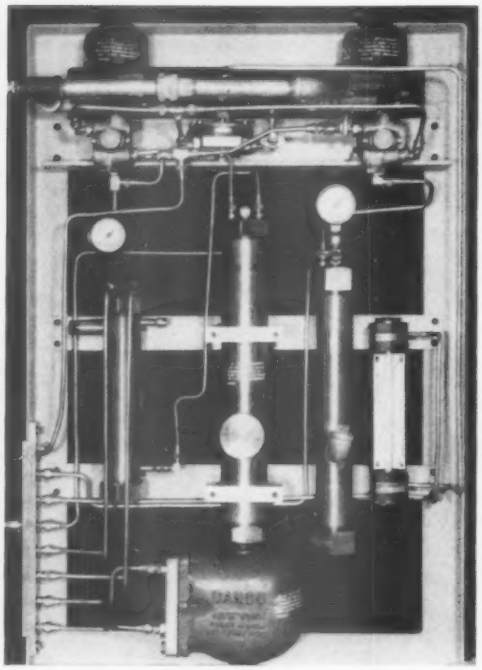
Consult your nearest mud company distributor

brooks paper company

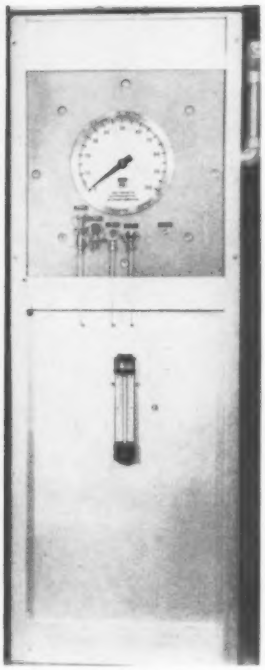
SECURITY BUILDING • ST. LOUIS, MISSOURI



Automatic infrared analyzer.



Typical infrared analyzer sampling system.



Automatic differential refractometer.

Infrared Analyzers Improve Processing Operation

Phillips uses these instruments to continuously monitor and control plant streams

by D. E. Berger*

THE petroleum-refining, petrochemical, and natural-gasoline separation industries by virtue of large-scale continuous processing of organic liquids and gases constitute the largest field of application for on-stream analyzers.

The experience of Phillips Petroleum Co. in design, manufacture, application, and operation of these instruments has been gained from this work, which has as its object the improvement of our processing operations both in regard to product and quality.

Desirability of Composition Knowledge

Products from processing plants must be produced to certain specifications and the process variables which are measured and controlled are a means to that end. The end itself is product composition. Dependence is then placed on chemical and physical laboratory analyses for composition information. This same method of composition control is used at many points within the process, and by means of sampling at various intervals the data for continuous plant control and periodic material balance evaluation are obtained.

In many cases continuous control of process variables to give steady operations combined with frequent laboratory tests is sufficient to give reasonably good plant composition control; however, as laboratory tests become more involved and time consuming, the lag between the time of sampling and the analysis report becomes excessive and operations may wander widely from the optimum composition control point.

As more precise control of composition is desired present control measurements, such as temperature and pressure, even if made to the required degree of accuracy, are still nonspecific measurements and therefore may become ambiguous if other components are present, or if other process variables influence the control correlation to an undue extent.

Two process types . . . In general there are two types of processes, reactions and separations, and consideration of the process variables of each is necessary. In the catalytic dehydrogenation of butylenes to produce butadiene, for example, the interrelationship of temperature, pressure, space velocity, catalyst activity, and several other variables must be known to bring about a specified conversion at an acceptable efficiency.

Usually, as catalyst activity decreases because of aging, compensation for loss of conversion is obtained by raising

*Chemical engineeer, Phillips Petroleum Co. Presented at the A. & M. College of Texas symposium on Instrumentation for the Process Industries, 1953.

reaction temperature. If the process is cylic, a noticeable decrease of conversion takes place during the cycle.

These effects are determined now by complete laboratory fractional and infrared analysis of samples which represent both the long-term and short-term catalyst decline. From this, it can be seen that correction for loss of conversion can be made only in a stepwise fashion following the analysis report. It is thought that operation at constant conversion level is highly desirable but it is difficult to obtain even by use of cam-operated temperature control.

The penalties involved in underconversion and overconversion are quite obvious. Underconversion is loss of production capacity and makes product separations more difficult. Overconversion results in lower efficiency and leads to a shorter catalyst life. The correlation of one or several components in the cracked gas with conversion can be used to follow and control conversion, and to make rapid correction for the catalyst decline. To do this, an infrared analyzer or another specific composition analyzer can be used to report, for example, the butadiene content of the cracked gas continuously, and an override control of reaction temperature may be made either by the operator or automatically. In this way conversion control may be achieved. In such a problem, temperature measurement and control are not sufficient since catalyst activity and decline must be also taken into account.

Fractionation problem . . . The problem is somewhat similar in the case of the separation of isobutane from normal butane by fractionation. Here by virtue of the coexisting liquid and vapor phases, pressure, temperature, and composition are interrelated. Then with pressure held constant, composition and temperature are directly related. If only two components are present, composition may be found by interpolation between the boiling points of the pure components at fixed pressure.

For example, at 100 psia., isobutane boils at 122.5° F. and normal butane boils at 145.5° F., therefore a 50-50 mixture will boil at 134° F. The analytical sensitivity then is such that a change of one degree F is equivalent to about 4 per cent change in composition. Many columns are satisfactorily operated on this correlation. However, if a third or fourth component is present at the temperature measuring point the correlation is changed and the interpretation becomes ambiguous. This simply means that in a binary system, a sufficient number of equations is available for the calculation of composition from temperature. With additional components present, more equations are needed. These can be obtained only by composition analysis, by measurement of other physical properties not necessarily specific, or by assumption of fixed concentrations of the additional components.

In a deisobutanizing fractionator generally propane and isopentane are present in the feed stream in varying amounts and thereby detract from the accuracy of the binary control correlation. A change in concentration of 1 per cent propane at the temperature measuring point will change the temperature about 3° F. which is equivalent to about a 12 per cent change in isobutane concentration.

Composition determination by means of an infrared analyzer offers a specific method of control. By analyzing for either isobutane or normal butane at a certain point in the column and using the analyzer to actuate the column control system to maintain the concentration constant at that point, the operation can be held at steady-state conditions.

Economic Considerations

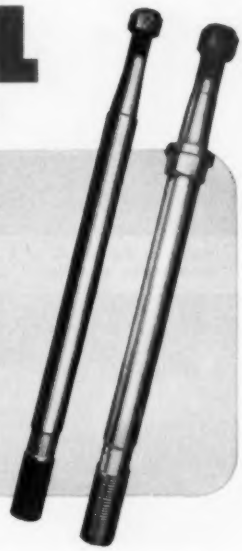
The problem of an economic analysis of an analyzer-control installation is

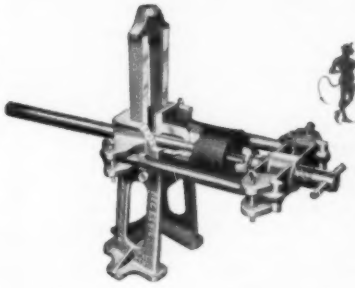
RED DEVIL

"DIA-HARD" PISTON RODS

For high pressure abrasive service

RED DEVIL Piston Rods are first choice where drilling conditions are severest because of the extreme hardness of the deep HIGH-CARBON wear resistant "DIA-HARD" case, coupled with tough core properties which give the highest tensile strength against breakage. All rods are hardness tested and precision gauged to maintain a world-wide reputation for quality. Write for Catalog No. P-101.





RED DEVIL PISTON PULLER

For tapered type rods

The usual practice of removing pistons from rods by blows of a sledge hammer often damages either pistons or rods. A Red Devil piston puller easily and quickly removes badly stuck pistons without injury to either part. All elements are made of finest quality alloy steel, heat-treated for strength and long life. Write for Catalog No. P-106.

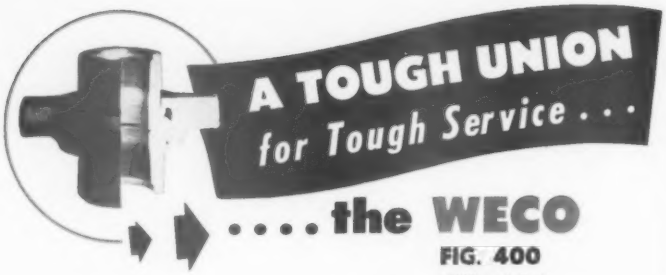
RED DEVIL PISTON ROD LOCK NUT

These "Hammer Lug Type" nuts provide a fast and positive means for locking piston rod in crosshead. Made from alloy steel and heat treated, they will last indefinitely. Face of nut is precision machined for full seating surface at right angles to axis of threads to prevent fatigue stresses in rod. Write for Catalog P-102.

Complete information in Composite Catalog or write for price catalogs noted above. Red Devil products are available through your supply store.

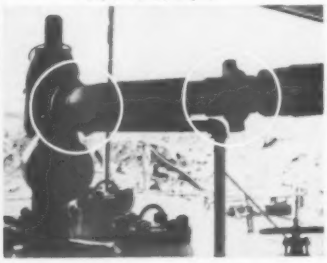
OIL WELL MANUFACTURING CORP.

6002 South Alameda St., Los Angeles 1, California



A TOUGH UNION
for Tough Service . . .
. . . . the WECO
FIG. 400
4000 p.s.i. Test
Sizes: 2", 2½", 3", 4", 5⅛" O.D., 6", 7" O.D., 8", 10"

The Weco Fig. 400 is ideal for pump suction connections.



Weco Fig. 400 unions save time in connecting up pump discharge lines.

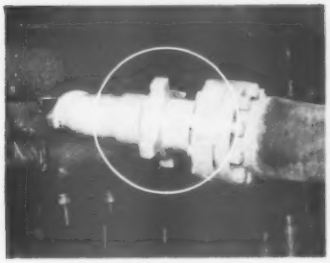
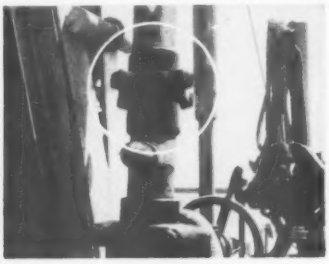


Fig. 400 Union on mud line.



4" Weco Fig. 400 Union on stand pipe.

● Unions in service on drilling rig lines get a lot of rough treatment. These mud, steam, water, oil, gas and other lines are made up and broken out frequently . . . carry fluids at high pressure with lots of vibration. The WECO Fig. 400 Union withstands more abuse in these tough services than any other union. Thicker sub end walls resist distortion . . . provide greater strength with less weight. The famous Weco ball and cone seat assures a perfect seal, every time.

SOLD EXCLUSIVELY THROUGH SUPPLY STORES

PESA

It's Wise to Standardize with . . . WECO . . .

WELL EQUIPMENT MFG. CORP.
Division of Chiksan Company
HOUSTON 1, TEXAS
CHIKSAN COMPANY
Brea, Calif. Chicago 28, Ill. Newark 2, N. J.
CHIKSAN EXPORT COMPANY, Brea, Calif. Newark 2, N. J.

Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

very difficult due to the fact that statistical analyses of operations without and with the analyzer must be made and compared. Also since some time necessarily passes between these two selected periods, the plant conditions, that is, compositions, throughputs, and energy inputs, usually have changed sufficiently to cast doubts on the accuracy of comparison.

A number of analyzers installed in Phillips plants are estimated to be returning from several thousand to several hundred thousand dollars per year. The instrument payout times then range from a year down to a matter of a few days.

To evaluate the possibilities of analyzer control of the isobutane-normal butane separation, a series of calculations were made assuming some quite realistic conditions. A 50-plate fractionating column of sufficient diameter to handle the loads imposed by the 5 to 1 reflux to feed ratio is to be used to separate a natural butanes feed containing 25 per cent isobutane and 75 per cent normal butane. Current practice dictates that nearly complete recovery of isobutane be obtained so generally the normal butane kettle product is of high purity and the isobutane overhead product of lesser purity. To produce a kettle product averaging 2.35 per cent isobutane, it is assumed that a 1.4 per cent isobutane stream will be produced for one period, then a 3.3 per cent isobutane stream produced for an equal period. This kettle product when blended would average 2.35 per cent isobutane. The two overhead products corresponding to the two kettle products when blended will average 91.5 per cent isobutane (respectively 87.4 and 96.3 per cent isobutane).

In cases where products of higher purity than those used in the example are desired, the benefits can be much greater than those calculated. It has been shown by several installations that the infrared analyzer can be used to obtain this very steady type of control of butane-splitter columns, when the continuous analytical instrument serves as a guide for the operator, or better yet when it is used in an automatic control system. These same factors and results apply to more complex separation systems and consideration of the possibilities may supply the justification for purchase and application of an analyzer.

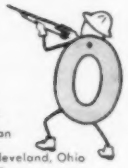
Sample Points

The selection of points for sampling an isobutane-normal butane fractionating system for infrared analysis requires that several decisions be made. The first is whether continuous data are desired for material balance and production purposes, whether the analysis

Rugged ...but SMOOTH

it's a WICHITA *Air-Tube* clutch!

See Us at TULSA MAY 14-23



WICHITA DISTRIBUTORS

Brehm-Lahner, Inc., Detroit, Michigan
L. H. Fremont, Cincinnati, Ohio
Pneumatic Power Equipment Co., Cleveland, Ohio
W. G. Kerr Company, Pittsburgh, Pa.
Smith-Keser & Co., West Hartford, Conn.
Smith-Keser & Co., Philadelphia 44, Pa.
Smith-Keser & Co., Westwood, N. J.
Tool & Machinery Sales Co., Buffalo, N. Y.
Frank W. Yarline Co., Chicago, Ill.
Power Rig & Equipment Co., Inc., Long Beach, Calif.
John C. Burge, Inc., Oklahoma City, Okla.
Empire Machinery Company, Odessa, Texas
Empire Machinery Company, Abilene, Texas
Oilfield Motor Service, Alice, Texas
Petroleum Equipment Distributors, Ltd., Edmonton, Can.

The rugged, compact construction of a Wichita Air-Tube Disc Clutch assures you continuous service over a long period with very little maintenance.

This clutch is engineered for *smoother* operation, faster engagement and disengagement, cooler running, longer life, easier maintenance, and minimum *SLIPPAGE!*

Take advantage of the BETTER PERFORMANCE! Equip your machines with Wichita Clutches . . . NOW! **A Wichita Engineer is available to give you complete Engineering data . . . CALL HIM TODAY!**

WICHITA Falls
FOUNDRY & MACHINE CO., INC.
WICHITA FALLS, TEXAS, U.S.A.

Ad 503

is to be used as a guide for operator control or whether the instrument is to be used as a control device. If material balance and production data are desired then the final product streams from the fractionation system must be sampled and analyzed.

In one refinery, the operation of a deisobutanizer is indicated by analyses of an isobutane stream and a normal butane stream each of which has been further fractionated upon leaving the deisobutanizer. This method results in a moderate time lag but is adequate for monitoring purposes. In another refinery two deisobutanizers in parallel operations are "balanced" by the operator by maintaining the same isobutane concentration in the overhead product of each column. This would be a good control possibility except for the fact this analyzer's duty is five-stream cyclic analysis.

A third analysis performed by this instrument monitors the normal butane production from this system which indicates the averaged kettle product isobutane content. These are good examples of the material-balance type of plant analyses. They are also used as guides for operator control with the time lag taken into account.

For automatic control use, sampling of the material on a plate in the column itself is preferred. From the nature of the concentration gradients of the various components throughout the column, regions of rapid concentration change of key components (with the presence of only small concentrations of light and heavy components) may be found, and these are the best places for sampling for automatic control purposes.

In general, these sensitive sample locations occur about midway between the bottom of the column and the feed entry and midway between the feed entry and the top of the column. Therefore, automatic control analyzers are used to take samples from plates such as the fifth, tenth, sixteenth, twenty-fourth, sixty-eighth, and others of columns separating a wide variety of components.

Automatic Control

The ways of making use of a continuous analysis which is now merely a position on a recorder-controller chart are probably of considerable interest. Since most of the control systems use air-operated control valves, the potentio-meter recorder is equipped with an air control system utilizing proportional band and reset features. The controlled air output from the recorder-controller is then used to position a motor valve on a stream which has a direct influence on the separation being made.

Since the largest streams in a fractionating system are the reboiling steam, reflux and feed flows, it is advisable to control the rate of flow of overhead product, kettle product, or possibly feed by means of the analyzer. With the other flows controlled by rate of flow or liquid-level instruments the system becomes in effect a material-balance type of control with the analyzer determining the percentage of the feed taken off as one product such that a specific composition is maintained at the analyzer's sample point. By difference, then, the other product is taken off under liquid-level control. Since reboiling stream and reflux are directly related, one is put on rate of flow control and the other on liquid-level control.

It is particularly important properly to adjust these two instruments so that very smooth operation is obtained, since the quantities of materials handled are usually large and when near maximum load conditions, moderate changes in rates could cause column flooding. A pneumatic-set rate of flow control may be used with the liquid-level control overriding it to prevent large sudden changes in rate. Using a pneumatic set rate of flow control on the stream which the analyzer is to control will result in a very stable system and it provides protection against analyzer or sample system failure.

Control systems . . . Two typical systems used are first, rate of flow control of feed and stream, accumulator liquid level control of reflux, reboiler liquid-level control of kettle product, and analyzer control of overhead product. Here, pneumatic-set rate of flow control is used on either or both reflux and overhead product with liquid- level and analyzer overrides, respectively.

The second system is different from the first only in that the reflux is on rate of flow control and the steam is on accumulator liquid - level control. Other composition analyzers may be used in these control systems. For example, this second system is in use on five fractionators with differential refractometers setting the overhead product rate of flow control. The results are excellent. Again, somewhat off the subject of butane splitters but still on fractionator control, experience in control of furfural extractive distillation columns has shown that again, analyzer override control is desirable and very gratifying economically. In these applications, analyzer control of lean solvent feed or reboiler steam actuates the material-balance type of control system.

Sample Preparation

Generally speaking, the sample to be analyzed is taken from a vessel or line as a liquid or as a vapor at its dew point, and therefore requires vaporization and pressure reduction. Vaporizer-regulators have been constructed and are used on nearly all installations so that the heat of vaporization is supplied by steam at the point of pressure reduction. Normally small amounts of pipe scale and dirt are found in the cleanest streams so filters are used to prevent clogging of pressure-reducing valves. Often water and heavy liquid hydrocarbons are present in the sample streams and these are removed or brought to constant trace amounts by means of sample washing and scrubbing equipment.

To keep a relatively constant flow rate of sample to the instrument, a differential-pressure type of flow controller is used along with a rotameter flow indicator. A constant sample flow rate also insures a constant analyzer cell pressure and temperature. To select and direct the various gas streams required for multistream analysis and automatic standardization of the infrared analyzer, solenoid or cyclic valves are used in conjunction with a timing circuit within the analyzer. Portions of the sample system and the switching valves are built into the analyzer itself so that the proper components are included in the analyzer installation and are accessible for maintenance.

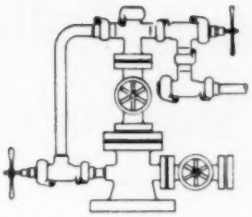
Installation of the solenoid valves and the related electronics within an explosionproof housing helps to keep the installation neat as well as safe. The problems which must be solved in sample preparation are as varied as the installations of these instruments. The handling of corrosive as well as noncorrosive liquids and gases to obtain a representative sample stream continuously will tax the ingenuity.

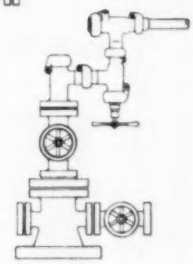
Presentation of Analysis

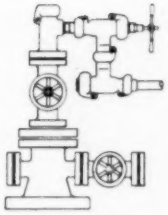
The sample stream composition is generally recorded on a circular or strip-chart-type potentiometer recorder located in the process-control house. Since most infrared-analyzer calibrations are far from straight lines either a special chart and scale must be made to conform to the calibration curve, or, in certain cases, electronic circuits may be employed to linearize the record, or calibration curves or tables must be used, and this is frequently done.

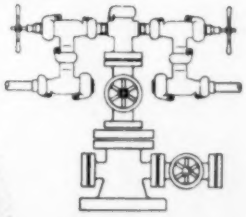
If the instrument is used for automatic control, then it is less important to have the analysis read directly since the object is steady operation at one preset level with only infrequent changes. If, however, the data are used for material - balance evaluation and product monitoring, it is important to have the calibration readily available, or better yet have a direct-reading recorder.

Any way you look at it... by any standard





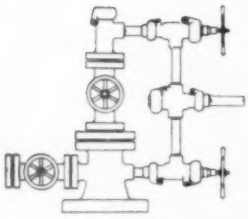




UNIBOLT

Flow Manifolds

make your trees lighter, yet stronger and more economical



Ask your Christmas tree supplier to furnish UNIBOLT Flow Manifolds (everything above the master valve). These compact, completely salvageable manifolds, consisting of a Tee or Cross, Adjustable Wing Valve, and Positive Choke Body, are pressure-tested as a unit and may be assembled in a number of combinations to best meet individual needs.

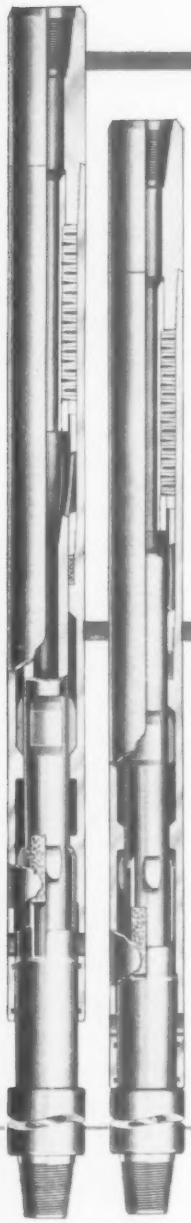
Employing standard UNIBOLT connections rather than flanges, the UNIBOLT Flow Manifold is many pounds lighter, yet the UNIBOLT design, which places more metal in shear, actually results in a higher factor of safety for the manifold.

Furnished in regular forged steel or in high-chrome alloy for corrosive wells — 6000, 10,000 and 15,000 lbs. test.

THORNHILL-CRAVER COMPANY

P. O. BOX 1184 HOUSTON, TEXAS

No Wonder the Shaffer-Waggener Bumper Safety Joint is Revolutionizing Today's Drill String Protection!



Locked Position

Tripped Position

THE ECONOMY AND SAFETY OF 2 TOOLS IN 1

backed by performance records like these . . .

On California's deepest well, a Shaffer-Waggener Bumper Safety Joint running in the drill string just above the drill collars, proved invaluable in recovering the drill string from a depth of 18,136 ft. When the string became stuck, only 2¾ turns of back torque were required at the table to release the Safety Joint portion of the tool, permitting immediate recovery of all drill pipe. Fishing jars were then placed in the recovered string, with the recovered portion of the Bumper Safety Joint on bottom, and this string was run back into the well. The tool was easily reconnected to the Safety Joint portion on the fish, and after jarring the drill collars and bit loose, the entire string was recovered—*from approximately 3½ miles deep*—leaving a completely clean hole!

On another well a Shaffer-Waggener Bumper Safety Joint was in the string between drill collars and drill pipe when the string parted going into the hole, dropping over 2,400 ft. of pipe and drill collars 5,000 ft. to the bottom of the well at 16,883 ft. First, the top of the fish was gripped with a socket and the Bumper Safety Joint released, permitting immediate recovery of 2,100 ft. of drill pipe. Then the upper part of the Bumper Safety Joint was run back into the hole below a set of jars, reconnected to the lower part of the Bumper Safety Joint and—after jarring—the drill collars were completely recovered *from over 3 miles deep*, leaving the hole completely clean!

Besides operating successfully at even great depths, this tool takes slant holes in stride—has been used efficiently in extreme directionally-drilled wells with a slant of 60°!

In fact, on job after job—from the shallowest to the deepest—the Shaffer-Waggener Bumper Safety Joint is bringing entirely new standards of safety, efficiency and protection to modern drilling operations!

Combines 2 tools in 1

The Shaffer-Waggener Bumper Safety Joint is the *only* tool of its kind—the ONE tool that combines BOTH *jarring* and *releasing* action—each under the full control of the operator. And not only does it combine in *one* tool the protection usually requiring several tools, but it also provides advantages *found in no other single tool or combination of tools!*

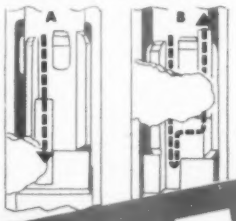
Check These Advantages . . .

To use the tool as a Bumper Sub it is only necessary to slack the weight of approximately 2000 ft. of drill string upon the Bumper Safety Joint, thus actuating a tripping mechanism which trips *automatically*, allowing the tool to strike a sharp downward blow. Raising the string then *automatically* resets the tool for another blow—and blows can be struck repeatedly and continuously by simply raising and lowering the drill string. It's simple, positive, *automatic!*

To use as a Safety Joint for quick release in the event the stuck pipe cannot be loosened, simply trip the tool and apply left torque as the string is slowly raised (A). The reverse torque rotates the drive keys into an unlocking slot (B) so that, by simply continuing to raise the string, complete release is effected. Further, the recovered portion of the tool can be used on the bottom of a fishing string and easily reconnected to the portion in the hole for simplified recovery operations.

As a Safety Joint the tool will not release until it is tripped. Therefore, it will transmit full torque loads in *either* direction—a definite advantage over conventional Safety Joints.

Two tools in one means simplified maintenance, simpler design, plus substantial savings in operating costs.



The many vital advantages of this revolutionary tool are too numerous to cover here, but are described in detail in an eight-page bulletin we will gladly send you. Write today!

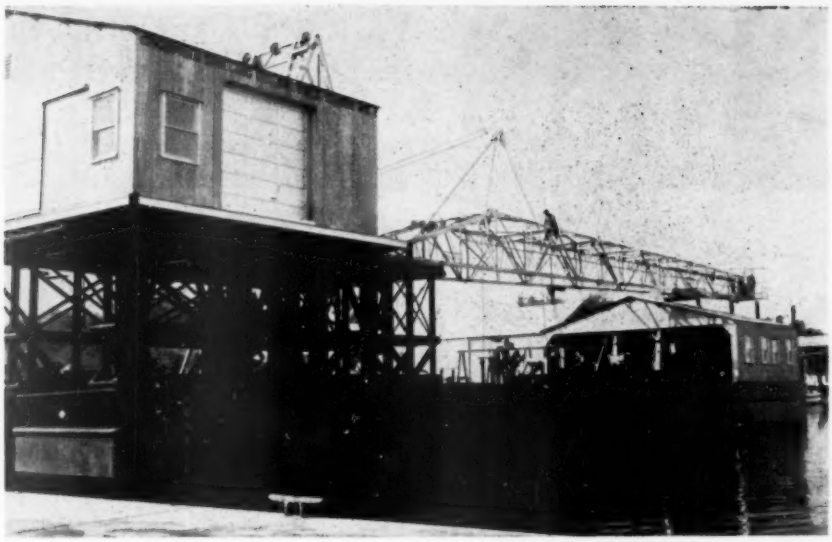
See your Shaffer representative for detailed information on Shaffer products. Or write for a free copy of the complete Shaffer Catalog.

30 years OF OIL TOOL LEADERSHIP

SHAFFER

HIGH PRESSURE DRILLING AND CONTROL EQUIPMENT • FISHING TOOLS THAT EXCEL

SHAFFER TOOL WORKS, Brea, California • California Service Shops: Santa Fe Springs and Taft
HOUSTON, TEXAS, 6006 Navigation Blvd. • ODESSA, TEXAS, 1025 West Second Street
OKLAHOMA CITY, OKLAHOMA, Acme Oil Tool Company, 1001 S. E. 29th Street
CASPER, WYOMING, Shaffer Tool Works, Post Office Box 1788
EXPORT SALES OFFICE: Shaffer Tool Works, 500 Fifth Avenue, New York, N. Y., U.S.A.



SUBMERSIBLE BARGE . . . General view of craft tied up at dock. Draw works is located in upper building in foreground, and mud pumps are in the building at far end, at right in picture.

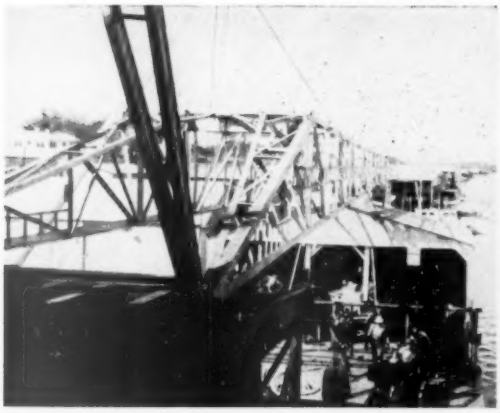
Good-Weight Distribution Features New Workover Barge

Jackknife derrick is supported by box-type frame running through pump-house roof. Design capacity of the 127-ft. derrick is 450,000 lb.

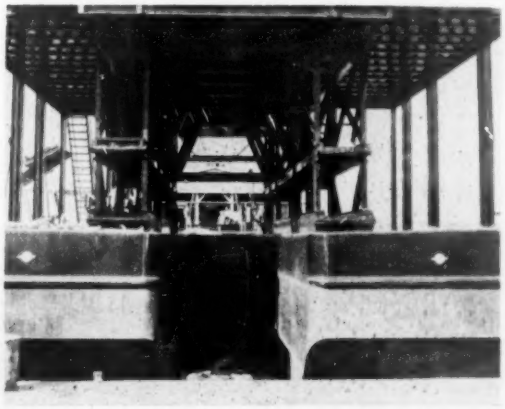
THE unusual feature of the new land rig of Columbia Drilling Co., Inc., Houston, which is especially adapted to shallow-water operations, is the very good weight distribution of the equipment. The draw works and pumps are at opposite ends of the barge. The barge design incorporates a slight slope toward the center to prevent pollution of bay waters.

The submersible barge, of all-welded construction, is 145 ft. long by 36 ft. wide by 12 ft. high. The slot, located in the aft end of the barge, is 8 by 50 ft. It has head clearance from deck of barge of 15½ ft.

If for any reason the barge at the slot end overhangs its supports there is



General view of derrick from upper deck.



View of slot end of the rig.

MODEL "O" DRILLS AT "LOWEST COST"★

IKE W. TAYLOR, PRESIDENT
JACOB E. TAYLOR, SECRETARY-TREASURER

TELEPHONES:
1238 LEWISTOWN, MONTANA
2100 CENTRALIA, ILLINOIS
P-5023 SAN ANTONIO, TEXAS

TAYLOR DRILLING COMPANY
ROCKY MOUNTAIN DIVISION
206 MONTANA BUILDING
P. O. BOX 349
LEWISTOWN, MONTANA

February 2, 1953

H. W. Cardwell,
c/o Cardwell Manufacturing Company, Inc.
Wichita, Kansas

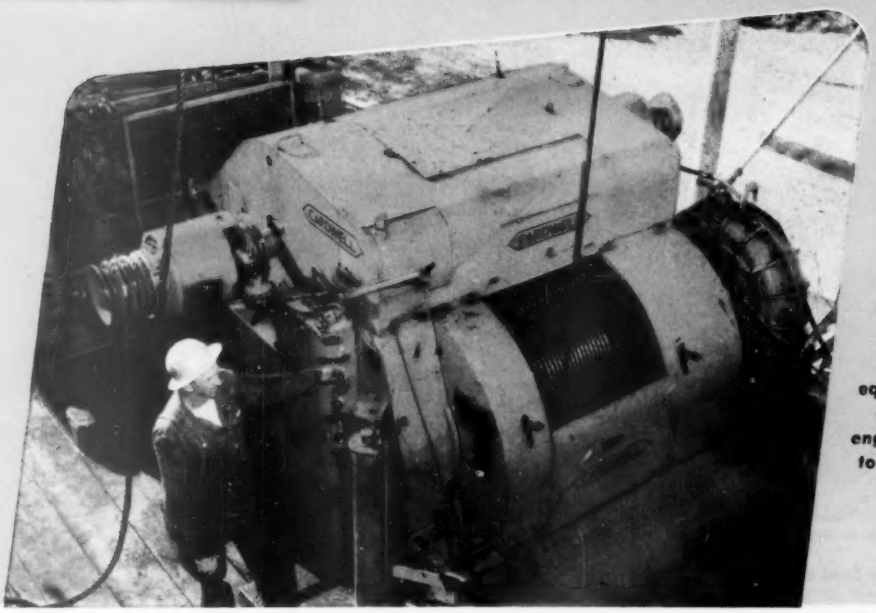
Dear Bill:

Of all the "Cardwell" equipment I have ever run, I believe I like this new Model O the best. Over the past eighteen years or so I have purchased and run the socks off every model rig you have ever build except your Model D.

This Model O was placed on 10,000 foot wells in the Williston Basin and certainly did a fine job. No unusual expense, no down time, and no operating trouble. The major company that I did this work for informs me that the wells on which this draw works were used was the lowest cost drilling in the Williston Basin.

Sincerely yours

Ike W. Taylor

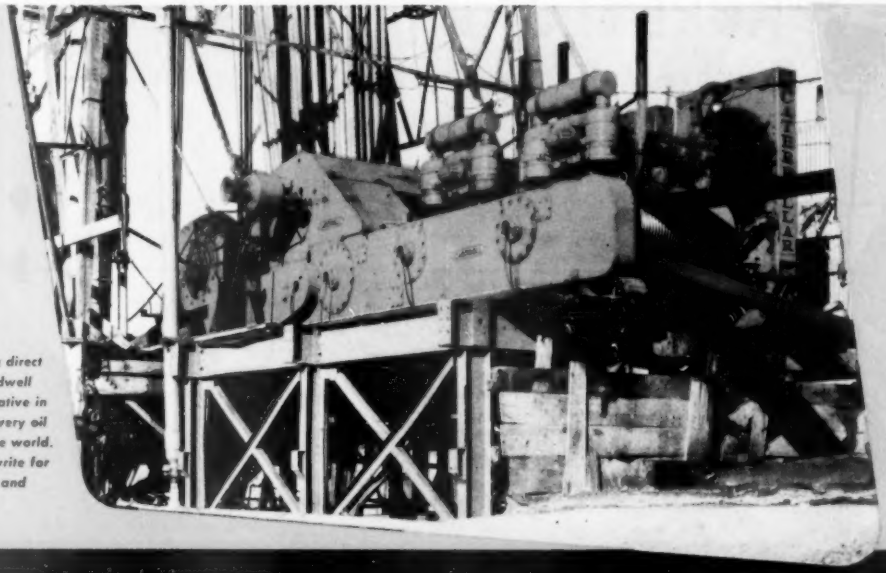


This Model O, equipped with two Caterpillar D375 engines, has drilled to 10,805 feet with 4½" drill pipe.

Thirteen years of continuous field use have proved that Cardwell has the fastest, most dependable, and easiest operated 6,000- to 10,000-foot draw works available. The Cardwell Model O air-controlled draw works combines rugged durability with utmost simplicity. It is equipped with Cardwell "Air-Disc" drum clutches, the only friction clutches that can be mounted in the drilling and sand line drums without increasing the rig width or reducing drum length, and still provide full capacity without slipping.

Other Model O clutch drives are equipped with Cardwell "Flex-Disc" air friction clutches that have been perfected through years of research.

Cardwell rigs are the only ones in the world with every wearing part heat-treated to eliminate down time as much as possible.



There is a direct local Cardwell representative in or near every oil field in the world. Wire or write for his name and address.

CARDWELL

REG. U. S. PAT. OFF.

THIS TRADE MARK INSURES HIGHEST QUALITY AT LOWEST PRICE

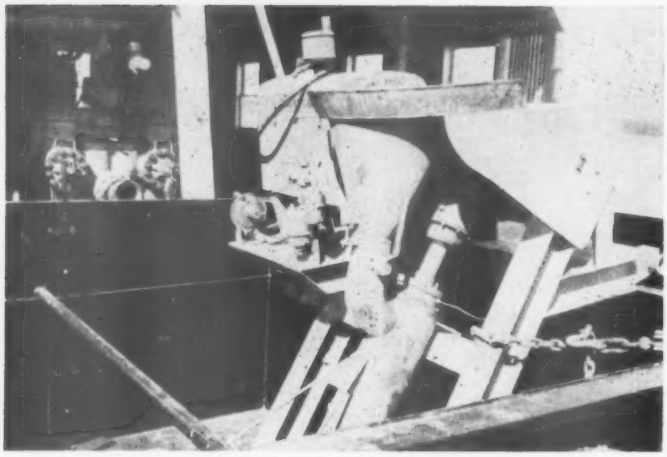
CARDWELL MFG. CO. INC.

P. O. Drawer 2001 . . . Long Distance Telephones 138—139—130

Cable Address: "ALL STEEL," Wichita — "CARDSTEEL," New York

Wichita, Kansas, U. S. A.

THERE IS A CARDWELL PARTS STOCK NEAR OR IN EVERY OIL FIELD OF THE WORLD.



Mud mixer is in foreground and in back the pump house is shown.

enough weight in the front end where the pumps are located to still make stable drilling possible.

The Columbia's barge is constructed of ⅝-in. bottom and deck and ⅜-in. side plate. There are six ballast tanks and two drilling-water tanks. The barge stores 2,700 bbl. of drilling water.

Pumps and tanks . . . Two mud pumps are situated on the main deck. Three mud tanks each have a capacity of 480 bbl. Suction and discharge lines are easily accessible for repairs. The mud tanks are 6 ft. in depth and are elevated 2 ft. above the main deck. The mud trough is pitched slightly from the shale shaker to the mud tanks and rides over the top of the tanks.

Drilling Equipment

The draw works is located on the upper deck which is 13½ ft. above the main deck. In addition to the draw works the upper deck has provision for radio communications and tool-supply storage.

The jackknife derrick is supported by a box-type frame running through the roof of the pump house. The derrick can be put into operating position from the horizontal position in a few minutes. The design capacity of the 127-ft. derrick is 450,000 lb.

Communication with land is provided by radio-telephone equipment, with a 50-watt transmitter.

The barge was engineered, designed, and constructed by Bethlehem Steel Co. with Columbia people, J. V. Teague, president; D. H. Smith, vice president; and J. H. Lester, secretary-treasurer, providing the necessary Columbia equipment.

Columbia's drilling barge is manned by I. V. Pavlas, tool pusher. Three tours consist of: S. B. Tullos, driller and J. B. Cook, L. E. Buchanan and R. R. Newsom, roughnecks; R. B. Hart, driller and D. L. Hart, E. E. Thorson and S. Cross, roughnecks; and H. C. Tullos, driller and J. M. Oxford, T. E. Currie and P. O. Zorn, roughnecks.

The **E-C Inclinometer** gives you

MORE of a RUN for your MONEY

than *Any Other* straight hole instrument

When You Run a Sperry-Sun E-C...

1. You know positively that the instrument was at rest when the record was made, otherwise the disc will show no reading.
2. You know positively— that the reading is accurate because you can run a simple double check in a few minutes by raising the instrument several feet and lowering it again to the recording depth for another reading.
3. And you can measure positively — the inclination of the hole at several points, if required, by taking several readings on one trip. The E-C is the *only* straight hole instrument with which multiple records may be taken on a single run.

• E-C rental rates are reasonable — you do not pay a premium rate for premium performance. Rent an E-C and keep it on the rig until the last foot of hole is made. It will give you more information with less cost, less work and less trouble than any other straight hole instrument. Contact the Sperry-Sun office nearest your location.

SPERRY-SUN OFFICES

Houston, Texas · Corpus Christi, Texas · Marshall, Texas · Odessa, Texas · Oklahoma City, Okla. · Lafayette, La. · Long Beach, Calif. · Bakersfield, Calif. · Ventura, Calif. · Casper, Wyoming · Farmington, N. M. · International Gas Lift, S. A., Caracas, Venezuela · United Drilling Services, Edmonton, Alberta, Canada

SPERRY-SUN WELL SURVEYING COMPANY

3118 BLODGETT AVENUE • HOUSTON, TEXAS

See our Exhibit at the International Petroleum Exposition, Booth 82, Scientific & Technical Building, Tulsa, May 14-23

YOU GET *MORE* FROM YOUR PUMPS

when you use American Iron Slush Pump Valves and Seats!

Made from high grade alloy steel forgings, precision machined and heat treated for longer life and higher pump efficiency.

AMERICAN IRON & MACHINE WORKS CO.
MANUFACTURERS OF OIL FIELD EQUIPMENT
A
REG. U.S. PAT. OFF.
OKLAHOMA CITY U.S.A.

PESA

MANUFACTURERS OF DRILLING EQUIPMENT • PRODUCTION EQUIPMENT • FISHING TOOLS • PUMP SPECIALTIES

Here's what's happening in

Mitigation of PIPE-LINE CORROSION

As Reported by

by Gerald L. Farrar
Engineering Editor

This report to Journal readers is compiled from technical papers, informal discussions, and symposiums presented at the recent annual meeting of the National Association of Corrosion Engineers in Chicago.

Technical papers from which some of the information is drawn are: "Cable System Design for Cathodic Protection Rectifiers," by R. M. Wainwright, University of Illinois; and "Cathodic Protection and High-Resistivity Soils," by H. C. Van Nouhuys, Southeastern Pipe Line Co. Abstracts of certain papers are used as indicated.

. . . Cable-System Design for Rectifiers

ENGINEERS frequently overlook one or more of the basic factors of design for current-carrying rectifiers in cathodic protection systems. The result of this oversight is the design of a system that is not satisfactory in its operating performance, or that is not as economical as it could be.

Basic design factors . . . The basic design factors to be considered in the design are:

1. Ability to meet mechanical stresses and other environmental conditions.

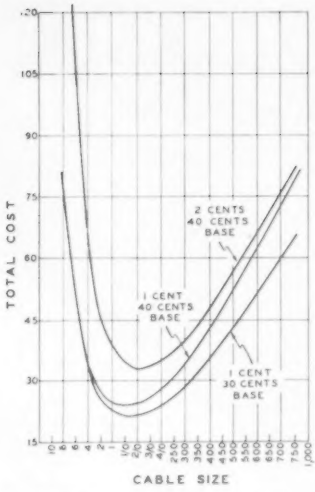
2. Ability to meet voltage attenuation limits. Usually no trouble is encountered here.

3. Ability of the insulation to withstand applied voltages. This is no problem in cathodic protection.

4. Ability to meet limitations on current due to temperature and insulation stability. It is not difficult to keep insulation temperature below manufacturer's recommended levels in cathodic protection work.

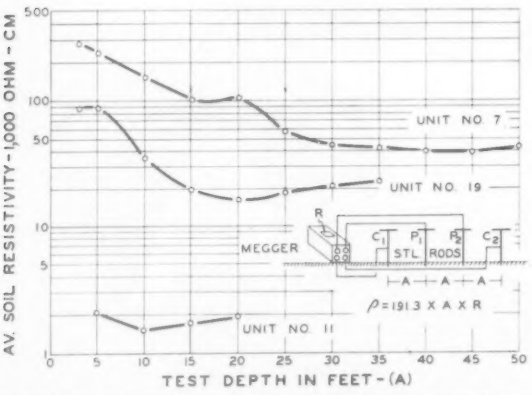
5. Conformance to Kelvin's economic law.

6. Conformance to legal codes, safety rules, and similar requirements. These points must be determined locally.

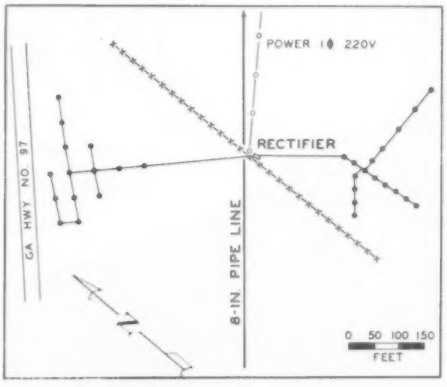


CABLE-SYSTEM total cost curve shows variation in total cost of a cable system with change in cable size. Parameters are based on (1) cost of power per kilowatt-hour, and (2) base price of copper per pound. Fig. 1.

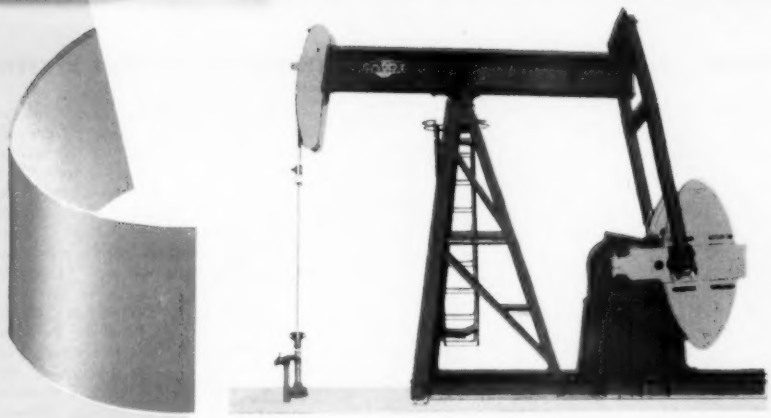
Environmental requirements . . . Normally overhead lines of the low-voltage d.c. types are designed using bare copper cable, although in some cases codes and other considerations will dictate weatherproof wire, aluminum, or other conductor materials. For underground lines, neoprene or neoprene-and-rubber combinations are currently favored as insulation material. The problem is one of chemical stability with long periods of time exposed to moisture and soils, and the maintenance



VARIATION OF SOIL RESISTIVITY with test depth for high-resistivity soil shows little change after depth of 40 ft. has been reached. Fig. 2.



TYPICAL ANODE LAYOUT used by Southeastern Pipe Line Co. in high-resistivity soil is shown here. Fig. 3.



A COMPLETE SERIES OF ADJUSTABLE CRANK PUMPING UNITS

Now you may select the adjustable crank pumping units exactly right for the depth and condition of your wells. The new Cabot Adjustable-Crank Series is complete, ranging in size from 11,000 to 32,000 pounds maximum polish rod load. The crank adjustment is accomplished in three simple steps by one man standing on the ground and with no complicated tools. The operation is absolutely safe and requires but a few minutes. The Cabot A-C Series incorporates all the outstanding features of other Cabot units . . . the EQUALASTIC® BEARING . . . herringbone reducer gears . . . wide-flange walking beams . . . four-legged derrick type Samson posts . . . floor clearing sub-bases. You must get the complete story on the new Cabot Adjustable-Crank Series before you decide on a new pumping unit.

Write or call your nearby Jones and Laughlin store or representative or write directly to Cabot Shops, Inc. for the complete story of the new Cabot Adjustable-Crank Series.

See the new Cabot series at the 1953 Oil Exposition

CABOT

CABOT SHOPS, INC.

PAMPA, TEXAS

of good insulating characteristics indefinitely. Mechanical stresses of underground cables are usually unimportant.

On positive underground cables (attached to + terminal of rectifier), all splices and underground terminals must be very carefully insulated, and must be absolutely watertight. The smallest pinhole in the insulation will create an anodic area on the cable with resulting rapid corrosion of the cable metal. Even asphaltic compounds or tars have been found inadequate unless carefully applied. In order to prevent subsequent corrosion it is also essential to obtain a bond between the tarry compounds and the sheath material of the cable. The use of the newer "scotch-tape" materials shows promise for this application.

The insulation of splices and terminals on the negative underground cable runs may theoretically be of poorer quality, since these cables will receive cathodic protection. However, since the cables will be near the ground bed, the voltage will be high with respect to the surrounding soil, and the resulting leakage current appreciable. In low-resistance soils leakage currents up to 25 per cent or more of rectifier output have been noted.

Kelvin's economic law . . . The law states that the proper cable size is one which makes the sum of the annual cost of the losses and the annual fixed charges a minimum.

Annual cost of losses may be calculated from the relation:

$$V = \frac{0.0876\ I^2\ R\ P\ L}{E} \qquad (1)$$

where

V = dollars per year
I = current in amperes in the cable
R = resistance of 100 ft. of cable
P = cost of power in cents per kw.-hr.
E = efficiency of the rectifier in per cent. This is used since power is metered at rectifier input.
L = length of cable in feet

For computational purposes Equation 1 can be divided into two parts, or factors, thus

$$V = M\ K_m$$

where $M = 0.0876\ I^2 R$, and $K_m = \frac{L P}{E}$

The annual fixed charges of a cable may be computed by the relation:

$$F = 0.15\ S\ L \qquad (2)$$

where

F = dollars of annual fixed charges
S = initial cost of cable in dollars per foot
L = length of cable in feet

The factor 0.15 represents an estimate of annual charges as follows:

0.02—depreciation
0.06—interest
0.04—taxes and insurance
0.03—operation and maintenance

Again for computational purposes, Equation 2 has been broken down into

$$F = C\ K_c$$

where $C = 0.15\ S\ (100)$ and, $K_c = L/100$

In Fig. 1 the total cost, as determined by the equation, $T = F + V$, is plotted. Proper wire size is that located by the point of least cost.

. . . Cathodic Protection in High-Resistivity Soil

SOUTHEASTERN PIPE LINE CO. operates a 485-mile line from Port St. Joe, Fla., on the Gulf of Mexico, to Chattanooga, Tenn. The line carries refined products consisting of house-brand and Ethyl gasolines, kerosine, and diesel fuel. Maximum line pressure is 1,150 psi. The line is 8-in. seamless steel to Atlanta, a distance of 367 miles, and 6-in. for the 118-mile remainder to Chattanooga. Wall thicknesses of the 8 and 6-in. lines are 0.322 and 0.280 in., respectively.

The pipe is 90 per cent bare.

Soil resistivities at pipe depth vary from 20,000 to 1,000,000 ohm-cm. When drilling holes for ground bed anodes, it is possible to reach soils in the 3,000 to 10,000 ohm-cm. range. Average anode depth is 20 ft.

Protection necessary . . . Necessity for cathodic protection in these high-resistivity soils was revealed by a long-line current survey in 1950. A total of 835 anodic areas were revealed, approximately 2 in every mile. It is believed that a detailed type of survey would indicate at least four hot spots per mile. Several hundred test holes, each 6 ft. long, were dug for pipe inspection. Pitting was general, with some pits being halfway through the pipe.

Eleven leaks have occurred in the line since its installation in January 1941.

The cathodic protection system was completed in October 1952. It consists of 25 rectifier installations so spaced that the pipe potential is lowered a minimum of 0.3 volt with respect to the soil as measured with a copper sulfate electrode located at remote earth. A standard of 300 ft. is used as the distance from the pipe to remote earth.

The system is designed to prevent any further leaks throughout the total length of the line, since a severe leak requiring line shutdown results in the loss of 1,600 bbl. per hour of product. No loop line is available, and demand has always exceeded supply. The high barrel of the lost refined product is also a factor. A third factor is the potential danger to life and property caused by leaking product, and its ability to destroy crops and pollute water supplies.

Protection criterion . . . The criterion of 0.3 volt lowering of pipe potential was selected because:

1. It required the least number of rectifiers to meet the criterion 100 per cent.
2. It provided for solid protection of bare pipe, rather than a spot protection system.
3. It put some protection on all the line.
4. Tests indicated it to be an adequate criterion for protection.
5. The system may be expanded to meet a more stringent criterion by increasing the size of rectifiers, or adding units midway between existing ones.

Protection current . . . While it is generally agreed that bare pipe lying in high-resistivity soils requires less current density for protection than pipe in low-resistivity soils, the value required for adequate mitigation is not available.

Current thought suggests 5 to 10 ma. per sq. ft. for soils below 1,000 ohm-cm., 3 ma. per sq. ft. for 3,000 ohm-cm., and 1 ma. per sq. ft. for 5,000 ohm-cm. resistivity. Projection of these data to high resistivities suggests that current densities in the order of microamperes per square foot should be sufficient.

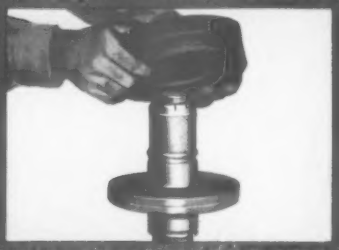
However, factors other than soil resistivity enter into the picture. Some of these are: (1) cells created by differences in resistivity, (2) cells created by different chemicals in adjacent soils, (3) cells created by difference in oxygen content in adjacent soils, (4) cells created by difference in moisture content in adjacent soils, and (5) cells created by difference of concentration of same salt in adjacent soils.

Average current density in the South-

Change the Rubbers and Save the Piston

KEEPS
mud pump parts
COSTS
DOWN

It's easy to remove the old rubbers and install new ones. The piston body is good as long as the wear groove is visible completely around the circumference of the body.



With the new Mission Rubbers installed, the piston is ready for another long run at a fraction of the cost of a new piston.

The secret to lower costs is right under your thumb . . . embossed on this page. Change the rubbers and *save* the piston! With Mission you reduce piston renewal costs three ways: (1) It's easier to replace piston rubbers because you don't have to remove the piston from the rod. (2) It's cheaper because you save the cost of the piston body. (3) Long-life rubbers make replacement less frequent. This means less down-time when Mission Pistons are used. Mission products are available in all supply stores. Specify "all-Mission."

MISSION
MANUFACTURING CO
HOUSTON, TEXAS

Export office: 30 Rockefeller Plaza, New York

eastern pipe line is 0.22 ma. per sq. ft. It is thought this provides corrosion mitigation of over 50 per cent, at least.

Ground bed location . . . In order to locate suitable low-resistance ground beds in high-resistivity soils, it is usually necessary to prospect with the four-electrode Megger test method. Readings, as shown in Fig. 2, are taken at 5-ft. intervals up to a depth of 50 ft. Where resistivities at 50 ft. are still too high, a rotary-drilling contractor is called in to go deeper. Also when the holes cave in and casing is required to get the anodes in, the rotary rig is necessary.

Tests have shown it economical to drill until low-resistivity soils are found. On unit No. 7, 56 anodes would have been required at a 20-ft. depth, while only 30 were actually required at the 40-ft. installation depth. As shown in Fig. 2, no significant change in soil resistivity occurred below the depth of 40 ft.

The savings due to the elimination of 26 additional anodes more than pays for the extra time spent drilling deeper, not to mention the savings in power cost due to lower ground-bed resistance. The number of anodes is determined by balancing anode cost with power costs. Anode spacing is 50 ft. A typical anode layout is shown in Fig. 3.

Cost data . . . Cost summary for the system is shown in Table 1. Ultimate protection cost is seen to be $84.60 per mile per year.

TABLE 1—COST SUMMARY

	25 Units	1 Unit	Per cent of total
Installation of rectifier systems	$112,500	$4,500	19
Power cost over 20-year period	$429,720	$17,189	72.5
Maintenance, $100/unit/year for 20 years	$50,000	$2,000	8.5
Protection cost for 20 years estimated life	$592,220	$23,689	100
Protection cost for 1 year	$29,611	$1,185	
Protection cost per mile per year for 350 miles of bare 8-in. steel pipe			$84.60

Selected Abstracts . . .

. . . of pipe-line papers

Field Tests of Exterior Coatings For a Pipe Line Conveying Fuel Oil Heated to 200° F.

E. R. STAUFFACHER and R. R. DAVIDSON.

FIELD experiments were made to determine a suitable exterior protective coating for an oil transmission pipe line to handle oil heated to 200° F. The pipe line, 41 miles in length, 8-in. Schedule No. 30 pipe, operating at normal working pressure of 600 to 800 psi. with three combined heating and pumping stations spaced at approximately 13.5 miles, was designed to transmit fuel oil from the oil refineries to a steam-electric generating station.

To test stability four different coatings were applied to 20-ft. lengths of 8-in. i.d. pipes connected in series and buried in the soil. Oil heated to 200° F. was then circulated through the pipe for approximately 2 weeks. Provision was made to apply an external pressure at three spots on each of the coatings of 10, 50, and 80 psi. by the use of suitable rods and weights.

The depressions formed were measured carefully throughout the test to determine the rate and magnitude on each coating. Open sections of the ditch, approximately 4 ft. in length for each coating, were provided to observe any sag which might take place on any of the coatings. After the experimental hot-oil circulation was completed, the ditch was opened and the coatings examined for distortion and adherence and electrical resistance measurements were made at the depression points.

Additional 40-ft. pipe lengths with each of the four different coatings were then subjected to cold bending by standard field equipment to a total angle of 15° and a radius of approximately 20 pipe diameters (14 ft. 5 in.). After each bend the coatings were examined for cracks and given a holiday detector test to supplement the visual examination.

Due to its ruggedness and freedom from distortion during the test the decision was made to recommend a ½-in.-thick asphalt mastic coating, using a 250° F.-melting-point asphalt for the hot-oil pipe line exterior coating.

The Measurement of Electrode Potentials

NORMAN HACKERMAN

THE measurement of the potential of a metal under given conditions is in reality the measurement of a difference in potential between the metal and a reference electrode or half cell. There are a number of reference electrodes available for use under varied circumstances, but those of most interest to the corrosion worker are the calomel half cells and the copper-saturated copper sulfate half cell.

There are two general methods of measuring cell potentials; one is by instruments connected directly across the cell terminals and the other is by balancing the cell potential against that of a cell of known potential. The sensitivity needed governs the specific instrument to be used. The accuracy obtainable depends on the ease with which the cell is polarized since a finite current is needed to actuate the indicator mechanism of any type of potential measuring instrument.

In addition, for cells of high resistance even very small currents introduce appreciable IR corrections. Correction for potential differences across liquid-liquid interfaces need be made only if values to ±1 mv. are needed. Normally, potential measurements of interest in corrosion problems need to be known to no better than ±5 mv. and oftentimes even greater variability is not harmful.

Comparison of Cathodic Protection Test Methods

KIRK H. LOGAN

THIS paper compares the results of cathodic protection tests including and excluding I R drop and with the reference electrode over and remote from the pipe.

The results of using the break in the current-potential curve as a criterion for protection are compared with lowering the pipe potential 0.3 volt and to —0.85 volt. The criteria do not agree.

Results of increasing the test current in equal steps are compared with those obtained by increasing the current by 50 per cent increments. Equal increments give smoother curves.

The necessity for equal spaced times of observation is discussed. This is desirable but not always necessary.

Data plotted on rectangular coordinate paper are compared with the same data plotted on semilog paper. Sometimes it is best to use both methods.

Tests were made in high, medium, and low-resistivity soils in all of which a break in the current-potential curve was obtained when the I R drop was eliminated. Similar breaks were obtained without eliminating the I R drop except in high resistivity soils but sometimes they were not as well defined.

The break in the current-potential curve usually occurs at a higher potential than 0.85 volt with respect to a copper-copper sulfate electrode and at a smaller current than that required to bring the pipe to that potential or to lower it 0.3 volt.

"Filiform Corrosion"

M. VAN LOO, R. R. BRUHN, and D. D. LAIDERMAN.

FILIFORM corrosion is a thread-like type of corrosion which develops under protective coatings on certain metals, usually in humid atmospheres. It is characterized by directional growth and definite structure. Controlling factors are the physical nature of the coating and the exposure conditions.

Normally each growing thread consists of an active head of an unstable corrosion product and an inactive body of a stable corrosion product. Filiform corrosion usually appears in an apparently haphazard or disorderly pattern. However, its growth is uniform and orderly in direction, rate and dimensions when developed under controlled conditions. The tracks do not cross one another but deflect or join in a predictable manner.

To date no direct relationship has been found between filiform corrosion and the metallurgical pattern of the surface, the presence or absence of light, biological activity or the presence of inhibitive pigments. It has been observed under both nonmetallic and metallic coatings, provided that the coatings are semipermeable and are sufficiently elastic to yield without rupture to the volume of the oxide formed.

Ditching machine with "cow catcher" digging last stretch of ditch near Cedar Valley, Tex., for Anderson Brothers Corp.

Welding machines in the foreground are carried on half-track to serve stringer bead welders in the spread of Houston Contracting Co. operating near Austin, Tex.

COMPLETED IN A YEAR . . .

Rancho Pipe Line Traverses Variety of Terrain

New crude carrier incorporates latest design and engineering ideas in laying pipe

by Paul Reed
Pipe-Line Editor

RANCHO PIPE LINE SYSTEM'S 457-mile, 24-in. crude-oil pipe line was built within a year from March 1, 1952, to March 1, 1953, over a route from McCamey in West Texas to junction and terminal points in the Houston area.

Over this route from an elevation of approximately 2,450 ft. to sea level the line crosses a variety of terrain. It passes from 100 miles of sage-brush plains at the west end on through about 200 miles of rough, rocky, hilly country between Eldorado and Austin. Thence it goes over 157 miles of rolling country to the coastal plains.

Engineering and construction were undertaken for the seven owners of undivided interests by Shell Pipe Line Corp. Construction was contracted by Anderson Brothers Corp. for the 266-mile section west of Cedar Valley near Austin and by Houston Contracting Co. for the 189-mile section east of Houston to Cedar Valley. Oklahoma Pipe Line Constructors subcontracted part of Houston Contracting Co.'s section.

This article was prepared through the assistance of executives of Shell Pipe Line Corp. including D. H. Lewis, vice president; O. W. Heyden, chief engineer; C. D. Winkelman and W. H. Shelley, project managers; and Fred H. Cummins, assistant project material man.

Back hoe digging ditch at creek crossing.

Pipe . . . The project was built of steel pipe of several wall thicknesses. Pipe of four wall thicknesses with 52,000 psi. yield is as follows:

71.04 miles of ⅛-in. wall at 79.06 lb. per ft., electric fusion welded.
29.98 miles of 11/32-in. wall at 86.85 lb. per ft., electric fusion welded.
88.14 miles of 11/32-in. wall at 86.85 lb. per ft., electric flash welded.
185.94 miles of ⅛-in. wall at 79.06 lb. per ft., flash welded.
66.16 miles of ⅜-in. wall at 94.62 lb. per ft., electric flash welded.

In addition there was also the following:

16.40 miles of 11/32-in. wall at 86.85 lb. per ft., 46,000 psi. yield, seamless.
2.90 miles of ½-in. wall at 125.49 lb. per ft., 42,000 psi. yield, seamless.

Wall thicknesses were utilized as follows:

½-in. for river crossings.

⅜-in. for creeks; also at junction and terminal end of line.

11/32-in. for high-pressure service for distances of 1 to 15 miles at the discharge side of each station as required by static head conditions.

⅜-in. for low-pressure service.

Welding . . . Initial welding in each pipe gang was done by two stringer bead welders closely followed by four hot-pass welders who moved up two joints at a time. At a spread of Houston Contracting Co., visited by the author near the Garfield station in Austin area, welds were being finished by 12 bell-hole welders operating in pairs with two welding machines mounted together on a trailer. Two welders would operate on six joints.

On ⅜-in. pipe frequently only one filler bead and a cap bead are run, but in some cases there are two fillers and a cap bead. For ⅜-in. pipe there are two fillers and a cap.

The following sizes and types of Fleetweld rods were used: (1) stringer, 5/32-in., No. 5; (2) hot pass, 5/32-in., No. 85; (3) filler, ⅜-in., No. 85; (4) cap, ⅜-in., No. 5.

Pipe protection . . . Main-line protection consists of double enamel coating reinforced by glass mat and with an outside wrap of light-weight 6-lb. impregnated asbestos felt.

To protect the pipe in rocky ground, the bottom of the ditch was padded with 6 in. of soft backfill free of hard objects.

Prior to backfilling the coating was protected against damage from falling rocks by placing a half section of 26-in. pipe about 18 to 20 ft. long over the 24-in. pipe. After about 10 in. of backfill had fallen on it, this half section was dragged ahead and the remainder of the ditch was backfilled.

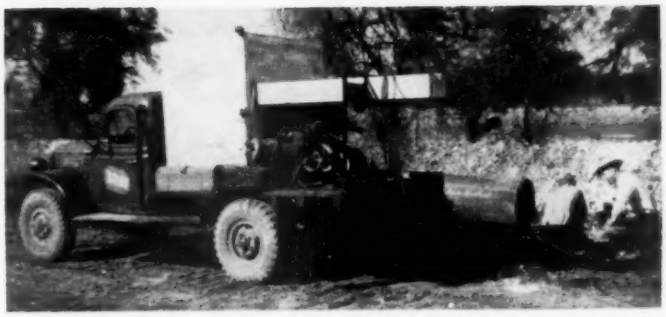
Pipe at river crossings and in casing at road crossings was tripled coated with three wraps of glass-mat reinforcing.

Solid concreting was done in three rivers with rocky bottoms where there was danger of the pipe being injured by boulders washed along in the streams during periods of high water.

After trenching to the usual depth padding was put in the bottom of the ditch with a minimum thickness of 2 in., to cover projecting rocks.

After the pipe was laid in the ditch, concrete mixers were pulled across the river by tractors for dumping concrete to form a solid concrete covering with a minimum thickness of 12 in. to fill from the top of the pipe to the river bed level.

Concreting of this kind was done at the Pedernales, James, and Llano rivers.



Portable dark room and equipment for running X-ray machine through the line for radiographic inspection of welding.

Cleaning and priming machine running on section being prepared for road crossing.

In the sandy bottoms of the Colorado and Brazos rivers, the triple-coated ½-in. river pipe was protected by a 2½-in. concrete sheathing reinforced by wire mesh, which was applied by the gunite method.

The wire-mesh reinforcement was held 1¼ in. away from the pipe surface by rings spaced at 36-in. intervals.

Block valves and insulating flanges were installed at both sides of river crossings.

Storage facilities at the upstream receiving point at McCamey include: six 80,000-bbl. and six 122,000-bbl. floating-roof tanks. Provisions have been made for 11 additional tanks in the future. Oil is received via the Texas-New Mexico Pipe Line Co. and Shell Pipe Line Corp. systems.

Common suction fill lines from the tanks to the central valve manifold consist of 26 and 30-in. lines. A 30-in. suction line extends from the central manifold to the Mesa station.

Oil is received at Bailey station via Pan American Pipe Line Co. system.

In the Houston area, junctions and terminals for deliveries to participants have the following lines:

1. Missouri City junction takeoff for deliveries to Phillips Pipe Line Co.

2. Genoa junction takeoff for Pan American Pipe Line Co.

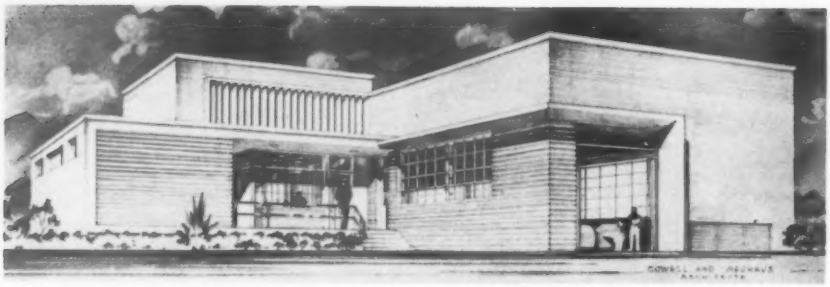
3. Pasadena junction is the operating center for dispatching crude to all of the various terminals. A line branches to the west with takeoffs for deliveries to Sinclair Refining Co. plant; it terminates at Eastern States Petroleum Co., Inc., plant.

A line branches eastward with takeoff for deliveries to Crown Central Petroleum Corp. plant; it terminates at Shell Oil Co.'s Deer Park refinery.

LINE CONSTRUCTION SUPPLIERS AND CONTRACTORS

PIPE . . . A. O. Smith Corp.; Kaiser Steel Corp.; Consolidated Western Steel Division of U. S. Steel Corp.; National Tube Division Lorain Works, U. S. Steel Corp.

CONTRACTORS . . . Houston Contracting Co. (189 miles) and Anderson Brothers Corp. (266 miles). Oklahoma Contracting Co. had a subcontract from Houston Contracting Co. for part of the latter's section. Gunite Concrete & Construction Co. was also a subcontractor under Houston Contracting Co. Hauling and stringing of pipe were subcontracted to Dunn Brothers, Inc., and Joe D. Hughes, Inc., by Houston Contracting Co. and Anderson Brothers Corp. respectively. Welding inspection was done by Industrial X-Ray Engineers.



Architects' conception of typical pump house on Rancho System.

EIGHT-STATION OPERATION PLANNED

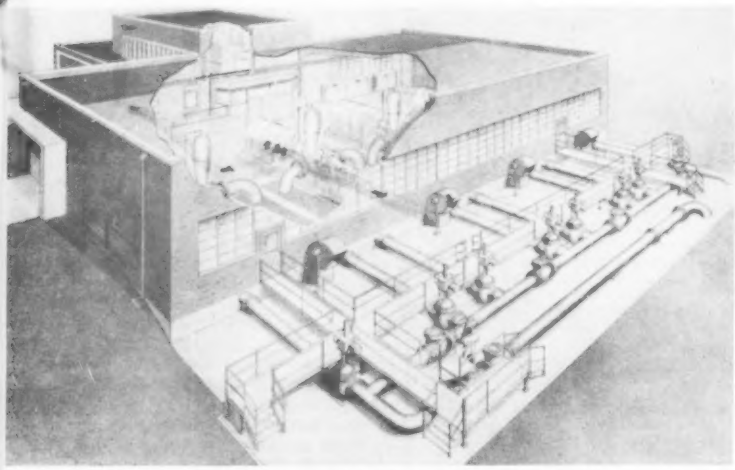
Rancho's Three Pump Stations Built for Initial Capacity of 208,000 Bbl. Daily

by Paul Reed
Pipe-Line Editor

PUMP stations of the Rancho Pipe Line System have been designed to incorporate the advanced features of pumping units, controls, ventilation, piping, and architectural arrangements characteristic of the Basin and Ozark Pipe Line systems for which they were originally developed.

The Rancho system has been recently completed as a 457-mile, 24-in. crude-oil pipe line from an elevation of approximately 2,450 ft. near McCamey in West Texas to sea level in the Houston area where deliveries are made for the owners of undivided interests which include Shell Pipe Line Corp., Sinclair Pipe Line Co., Pan American Pipe Line Co., Crown Rancho Pipe Line Corp., Nantucket Pipe Line Co., Phillips Pipe Line Co., and Ashland Pipe Line Co.

Design and construction have been undertaken by Shell Pipe Line Corp. which manages the operation of the system.



Cutaway view of typical pump house.

Three pump stations have been built for initial capacity of 208,000 bbl. per day. Designation and location of these stations are as follows: (1) Mesa station, northeast of Shell Pipe Line Corp.'s previous McCamey station; (2) Bailey station, 2½ miles southeast of Eldorado; (3) Garfield station, 3 miles east of Shell's previous Austin station.

Ultimately five more stations will be built to bring the total to eight for a throughput of 345,000 bbl. per day.

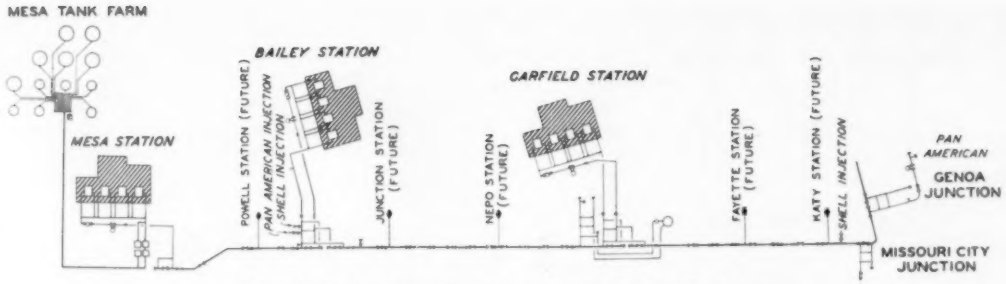
Estimates of capacity are based on 60 S.U.s. viscosity, 0.835 specific gravity crude oil and 97 per cent load factor.

Operating pressures for initial operation with two full units pumping at each of the three station are as follows:

Station—	Suction (psi.)	Discharge (psi.)
Mesa	25	650
Bailey	25	700
Garfield	170	850

Bailey is approximately 97 miles downstream from Mesa and Garfield is approximately 194 miles downstream from Bailey.

Main-line pumps for operation in series on the Rancho 24-in. line are three two-stage pumps and one single-



Schematic diagram of pipe line and stations of Rancho Pipe Line System.

stage pump built by United Iron Works.

Initially in the plan for three-station operation, only two of the three two-stage pumps will be in use at each station. The third will be a standby. When the ultimate eight-station operation is in effect, all three two-stage pumps will be in use. Under both conditions, the single-stage pump will operate when reduced pumping rate is required.

Main-line pumps . . . The two-stage pumps are 16-in. suction, 16-in. discharge centrifugal pumps rated to deliver 215,000 bbl. per day initially at 340 psi. differential pressure. Each pump is driven by a 4,160-volt, 1,750-hp., 1,780-r.p.m. electric motor.

The single-stage pumps are 16-in. suction, 16-in. discharge centrifugal pumps rated to deliver 215,000 bbl. per day initially at 170-psi. differential pressure. This pump is driven by a 900-hp., 1,780-r.p.m. electric motor.

Main-line pump motors take advantage of the reliability and low maintenance costs which are characteristic of squirrel-cage induction motors.

Undervoltage relay . . . A special undervoltage relay of induction type automatically guards motors against damage. It is equipped with a "time delay" device to prevent the relay from functioning under a low-voltage line condition until the preset delay time is past. This time interval is provided to keep the unit on the line during a momentary interruption of incoming power supply, such as occurs during switching of the circuit breakers in the power distribution network.

The Rancho stations combine the best features of manual and fully automatic operation to assure maximum line throughput with a minimum of trouble and maintenance. Opening and closing of valves and regulations of the rate of flow are done by electrical and mechanical devices.

By movement of a single push button, each unit is put on or taken off the line by a sequence of timed operations for valves, blowers, and pumps. Station equipment is safeguarded by some 40 automatic protective devices which function under conditions of hot bearings, overloaded motors, low-suction pressure, high-line pressure, and other irregularities.

A normal station crew consists of seven men including a chief engineer, an assistant chief, four shift engineers, and a utility man.

Station control . . . Control activities and clerical duties are executed in one location at the central control desk. This consists of two steel pedestals with sloping tops known as consoles. Between them is a writing desk, above which is a rear-enclosed gage panel. Consoles and desk are mounted in the bay window of the control room which juts out into the pump room. The console layout has been arranged on a diagram of the actual station layout.

It is provided that all protective devices stay within preset operating conditions for a motor and pump unit to remain on the line. Any of the following abnormal conditions which occur above or below preset values will shut down the unit, sound the alarm, and switch on the indicating light:

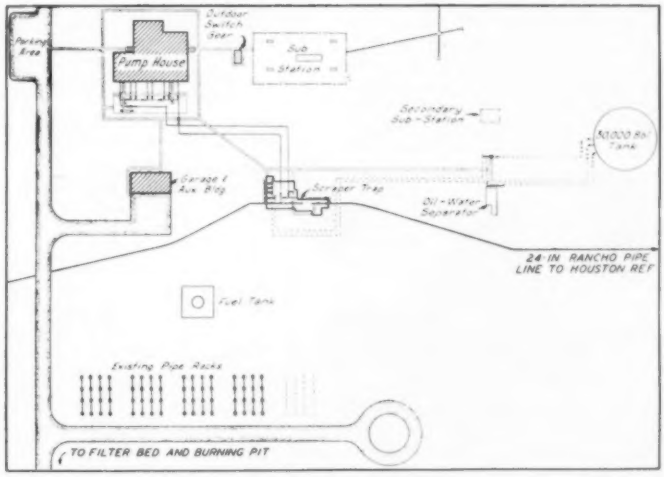
1. Low-suction pressure.
2. High-case temperature.
3. High-case pressure.
4. High-bearing temperatures in either pump or motor.
5. Overcurrent.
6. Thermal overload (high motor temperature).
7. Failure of air to flow through motor.

There is a deviation from this system in:

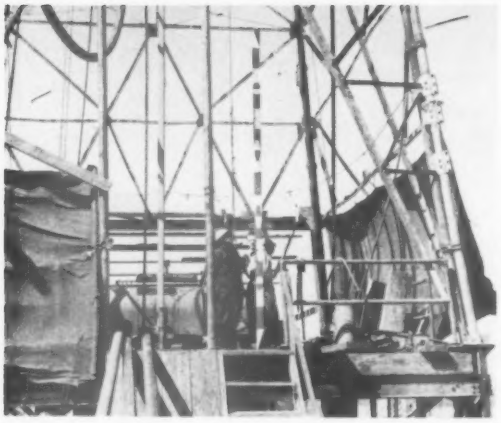
8. Winding overtemperature which signals only by alarm and light but does not shut down the unit.

Control for blower motors are for across the line (full voltage) starting. They provide remote control by means of: (1) push button, (2) relay, or (3) similar pilot control device of "full magnetic controller" type which provides complete protection for the motor and station operator.

(Continued on page 160)



General plan of Garfield station.



ELEVATION SURVEYING . . . The ground elevation of a new location near Bethany, Okla., is being obtained in picture to right; a derrick-floor elevation in picture to left.

Well-Elevation Services . . .

. . . and how they operate

by C. Malcolm Davis
Gulf Coast District Editor

IN order for geologists to be able to prepare subsurface contour maps and cross-sections for their studies it is essential that they be supplied with accurate elevations of the wells in the area being worked. Having these elevations is taken for granted; however, it is no accident that they are so readily available on scout tickets, electric logs, and drilling reports.

In the United States there are several companies whose business is obtaining and disseminating such information. The largest company is Laughlin-Simmons, of Tulsa. This company, which supplies elevations for all wells drilled within the shaded area on Fig. 1, has been selected to illustrate how these well-elevation services operate.

The obvious value of such a service to the oil industry is that duplication of effort is precluded. It would be virtually impossible for every operator to have to be responsible for his own well elevations. Not only would such a

TABLE 1—COMPLETE INFORMATION ON WELLS FOR SUBSCRIBERS

Fisher County, Texas Claytonville No.		Laughlin-Simmons & Co. of Texas	Central Texas District February 12, 1953 Elev.
A-805	Pure Oil Co. Comp.	Easterwood, 1 1,980 ft. FN & FW of Sec. 208, Blk. 3, H&TC Sur. 300 ft. N & 1,200 ft. E of Southern Prod. Co. No. 1 Mary S. Easterwood—5,500 ft. R.	2,127 2,118
Nolan County, Rowan & Hope			
A-175	Rowan & Hope Drilling	City of Sweetwater, 3-A 1,400 ft. FSW & 1,500 ft. FNW of Sec. 41, Blk. 22, T&P Sur. 990 ft. N & 900 ft. E of Rowan & Hope No. 1-B City of Sweetwater—6,500 ft. R.	2,359 2,350
A-176	Seaboard Oil Co. Drilling	Turner May, 5 2,591 ft. FNW & 2,505 ft. FSW of Sec. 42, Blk. 22, T&P Sur. 880 ft. N & 200 ft. W of No. 3—6,500 ft. R.	2,360 2,352

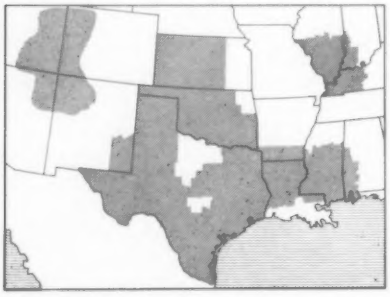


Fig. 1—Shaded portion of map shows area covered by Laughlin-Simmons well-elevation service.

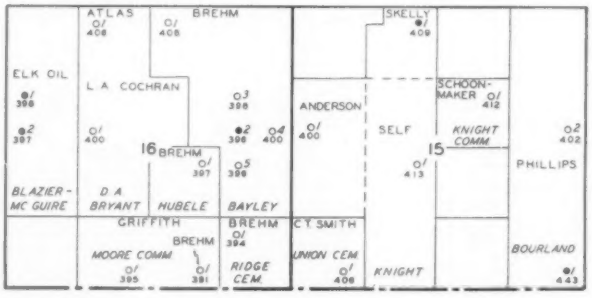


Fig. 2—Portion of map showing elevations of wells typical of the type available through Laughlin-Simmons.

practice be costly out of all reason but the job would never be able to be accomplished with the promptness required.

How Surveys Are Made

Well-elevation services supply ground and derrick-floor elevations. In some cases the survey is made before the derrick floor is erected. In such cases, of necessity, only an estimated elevation is given for this structure in addition to the accurate ground elevation. Field work must be routine and the surveyor must report the elevations as quickly as possible. Hence, he runs the stake rather than wait for his next week's trip through the area.

Survey parties . . . A surveying party is composed of an instrument man and a rodman. Surveying is done using plane table and alidade. Laughlin-Simmons employs 21 surveying parties and they thoroughly cover the area in which the company operates.

These 21 parties obtain the ground and derrick-floor elevations of all wells drilled for oil or gas within their company's operating territory with hard-to-believe rapidity.

During 1952 these parties ran 29,082 well elevations. They drove 964,774 miles to accomplish this big job for an average of 33.1 miles per well. By parties, the number of miles per well ranged from 77.0 to 17.1. One party alone ran 2,855 wells during 1952.

Bench marks . . . Laughlin-Simmons has established its own network of bench marks. Beginning with government bench marks, the surveyors have set permanent bench marks of their own at about 1½-mile intervals so that future surveys in the immediate area can begin at reasonable distances from new well locations.

These company-established bench marks consist of brass nails set in any convenient, permanent landmark. Locations and elevations of these bench marks are recorded and can be used as a starting point by any company party in the future.

What Subscribers Get

New subscribers to the elevation service may purchase detailed, large-scale maps showing well locations and elevations. A portion of one of these maps is shown in Fig. 2.

The extent of the company operations is illustrated by the fact that such detailed maps exist in the company files for its entire operating area. Any or all of these maps, which are constantly kept current, are available to subscribers at any time.

Subscribers to the service who have already been supplied with a map, can keep their own maps up to date from forms sent out by the surveying company. The information given on these forms is illustrated in Table 1. They show location of wells, ground and derrick-floor elevations, and lease operators. This is the same information that is used to keep the service company's maps up to date.

Byproduct . . . Sometimes an error has been made in the location of a well which is readily spotted by the elevation surveyors. Though locations are not the responsibility of the well-elevation service, there have been cases where locations were correctd by their work.

In addition to the use of elevations by the geologist in preparing his pool and regional maps and cross-sections, elevation maps for a fully drilled, older area can be used as a preliminary guide in planning a water flood with respect to locating water-injection pumps or drilling injection wells.

How Company Started

In 1926, R. W. Laughlin, then of Tidewater Associated Oil Co., and L. D. Simmons, then of Carter Oil Co., got the idea of establishing a well-elevation service. Through a group of oil companies they obtained locations and elevations of all wells in eastern Oklahoma. After compiling and classifying the information they supplied the participating companies with the over-all picture of eastern Oklahoma. This became the starting point of Laughlin-Simmons. From this point the surveying company grew until today it has offices and/or surveying parties in Wichita and Great Bend, Kans.; Oklahoma City, Shawnee, and Duncan, Okla.; Amarillo, Beeville, Corpus Christi, Houston, Midland, and Tyler, Tex.; Shreveport, La.; Olney and Mount Vernon, Ill.; Jackson, Miss.; and Farmington, N. M., in addition to the head office in Tulsa.

Other Companies

There is no overlapping of operations in the well-elevation surveying business.

In addition to the area covered by Laughlin-Simmons there are services for other areas of the United States. These are:

Powers Elevation Co., Casper, Wyo., which covers the Rocky Mountain area, except San Juan and Uinta basins.

Wichita Elevation Co., Wichita Falls, Tex., for North Central Texas.

Abilene Elevation Co., Abilene, Tex., which handles six counties in the Abilene area.

M. Clark of Mount Pleasant, Mich., for all of Michigan.

There are no comparable services in California or in the eastern portion of the United States.

How Present Operations Compare With Design Basis

(Continued from page 128)

Final hardness was removed by the injection of disodium phosphate in the boilers in conjunction with continued surface blowdown for removal of the light flocculant precipitate produced.

Several boiler-wall-tube failures occurred when operating at rates near design. It was felt that these tubes were overheated because of the formation of a light calcium scale within the tubes. In order to improve this condition, a high-temperature zeolite softener was purchased and installed and is now operating satisfactorily and producing a zero-hardness boiler feed water.

Combustion control . . . A variable combustion controller system for automatically controlling combustion while burning fuel oil, gas, or any combination of the two was added in June 1951. The system is built around a splitter mechanism developed by the local instrument department. When the fuel-gas system is 42 psig., the splitter adjusts the air loading to the fuel control valves so that the boilers are fired with 100 per cent gas. As the fuel-gas pressure drops, the splitter throws a progressively larger percentage of the air load to the fuel-oil valve until, at a fuel-gas pressure of 32 psig., the boilers are being fired with 100 per cent fuel oil. A relatively constant amount of gas is burned in the furnaces of the crude-distillation unit. With this system of controls it is possible to balance the refinery fuel gases so that it is unnecessary to flare gas until the gas production exceeds the entire plant's fuel requirement.

Bypasses on all of the air preheaters were installed to increase the outlet flue gas temperature and decrease the air heater corrosion caused by burning high-sulfur fuels (gas—10 weight per cent sulfur; fuel oil—3.5 weight per cent sulfur).

Because of the unbalanced condition of the steam used in the original plant design, it was necessary to install a condenser for the 15-psig. exhaust steam. There was approximately 20,000 to 45,000 lb. per hour of 15-lb. steam being outported to the air. This steam is now condensed and fed to the condensate surge drum. From this drum it is either used as spray water in the catalytic regenerator or is fed back to the boiler plant as condensate makeup.

The original plant design had two 1,600-cu.-ft. per minute air compressors to supply both refinery and instrument air. One of the compressors is driven

by 90-lb. steam; the other by a synchronous motor. In order to provide adequate standby capacity when a power failure shuts down the motor-driven compressor at a time when the main steam-driven compressor is undergoing repairs, a third steam-driven air compressor of 600-cu.-ft. per minute capacity has been installed.

Refinery tankage . . . The refinery had 64 oil tanks providing 182,500 bbl. of crude storage; 683,500 bbl. of intermediate storage for unfinished stock, and 500,500 bbl. for finished products. To this original storage capacity of 1,410,000 bbl., it has been necessary to add one 96,000-bbl. pan roof crude tank, one 96,000-bbl. heavy cycle oil cone roof tank, and one 96,000-bbl. light catalytic naphtha tank. In addition, the gasoline-blending system has been changed so that all components except tetraethyl lead and dye are proportioned and blended at one time by means of several flow controllers. This has improved the utilization of intermediate tankage.

The original tank-car loading rack consisted of 16 loading spots on each side of a loading platform. Because of the increased tank-car shipments, it was necessary to add three additional loading spots on each side of the loading platform. With these facilities, it is possible to load approximately 120 cars per day.

All the maintenance buildings and office buildings in the new refinery were originally quonset-type buildings. Because of the inadequacy of these temporary buildings, a complete new office building has been erected and, in addition, a new warehouse is under construction. The maintenance shops will be moved from their present quonset-type buildings as soon as a new shop building is completed.

Rancho's Three Pump Stations

(Continued from page 157)

Line regulation is accomplished by automatic control of pump operations so that all stations pump at the same rate. The consequent elimination of the need of float tanks permits operation with higher station suction pressures, thus facilitating the shipment of more volatile oil. Furthermore, contamination is reduced between successive batches of different oils. Such operation allows the use of pumps that inherently require high-suction pressure.

Hydraulic gradients on incoming and outgoing lines are matched at each station as a result of automatic pressure control for maintaining suction pressure above a desired minimum and station discharge pressure below a safe maximum.

Flow indicators are preset for high and low rate of control. If flow varies above or below these settings, a red light appears on the console and an alarm will sound. This does not cause a shutdown but warns the operator so that he may hunt for cause of the trouble.

Although head meters are only within 1 per cent of accurate, they function satisfactory for indicating and recording the flow of oil at pump stations.

Suction booster pumps . . . At the Mesa station at the point of origin of the system, there are two deep-well-type suction booster pumps. These are 30-in. suction, 20-in. discharge, vertical, single-stage centrifugal pumps, each driven by a 250-hp., 870-r.p.m. motor. These units are rated to deliver 215,000 bbl. per day at 90-ft. differential pressure. One of these is a spare.

Two similar suction booster pumps are installed by Pan American Pipe Line Co. at its Concho station for delivering from the latter's tanks to Rancho's Bailey station.

The deep-well type has advantages for booster service because a variation in the depth of the well accomplished by lowering the eye of the first-stage impeller makes it possible to get a positive suction head to insure full capacity flow without trouble from vaporization of the pumping liquid.

Mechanical seals . . . By use of mechanical seals in control of leakage outward along the pump shaft, pumps on the Rancho system depart from the practice which has been customary for holding pressure by soft or flexible shaft packing.

Crude from the line is strained and the clean oil supplied to the seals by a small vane-type pump mounted on the outboard end of each main pump shaft.

A reduced pressure of 250 to 300 psi. is maintained on the throat bushing bleedoff lines by a control valve and a relief valve which discharge to the station suction line and sump respectively. The two-stage pumps are provided with an equalizing line between the two throat-bushing bleedoff connections.

Station heating system . . . Both steam and electric heating units are used at pump houses.

The steam system employs three types of units: (1) steam radiators in pump room, operating room, switch gear and wash room; (2) steam heating coils in air duct serving switch-gear room and in air inlet to the pump room, and (3) suspension-type steam-heating unit in the communication-equipment room.

The electric system has two types of units: (1) electric-duct-type heater in the air duct serving operating room, and (2) suspension-type unit electric heater in the wash room.

Pasadena gagers' office controls . . . A central control board consisting of nine vertical sheet-steel panels bolted together is in the gagers' office building.

Miniature mimic buses are mounted on the panel front in relation to their positions in the pipe-line network. Valves are operated by push button from this central panel. Control is over a few pairs of conventional telephone circuits. Supervisory control is conducted by selective control and automatic indication of remotely located equipment by means of electrical impulses, through equipment for transmitting assigned codes.

This supervisory equipment will only perform the selected operation or else perform no operation. Outside interference cannot cause the equipment to operate the wrong device. Since the supervisory equipment permits control of many valves over only one pair of telephone wires, the supervisory equipment must automatically select the correct valve each time a valve control on the Pasadena Junction board is selected and operated. Pasadena Junction is considered the master controlling point. A signal comes to the Pasadena Junction board in case a valve is operated manually or by a push button at the valve itself.

Station buildings . . . Pump houses and auxiliary buildings are built of steel framing with scratched exterior face brick and glazed tile interior walls. Roofs are of standard buildup construction.

Operating the switch-gear rooms are pressurized by blowers. A slight vacuum is maintained in the pump room by exhaust fans. The pump house is heated by a low-pressure steam system served by a low-pressure boiler in the auxiliary building which has a maintenance and storage shop and garage.

At each station there are six ranch-type wood-frame cottages with asbestos roof and siding and attached garage.

This article was prepared through the assistance of Shell Pipe Line Corp. executives including D. H. Lewis, vice president; O. W. Heyden, chief engineer, and C. D. Winkelman and W. H. Shelley, project managers.

Construction of the pump station was contracted by Station Construction Co.

ALL PIPING for the plastic tank battery, including ells and joints, is of plastic "Cres-Line BR," manufactured by Crescent Plastics, Inc., Evansville, Ind. Plastic tanks are a product of Murdock Tank Co., Tulsa.

JOINING OF plastic piping with steel valve has long been a problem, but it appears to have been overcome on this installation. All fittings, with exception of valves, are of plastic.

All-Plastic Tank Battery

Tanks and piping on Superior's pilot water-flood near Owensville, Ind., were designed to prevent corrosion

AN all-plastic tank battery is in use on a pilot water-flooding operation of Superior Oil Co. near Owensville, Ind., 20 miles north of Evansville.

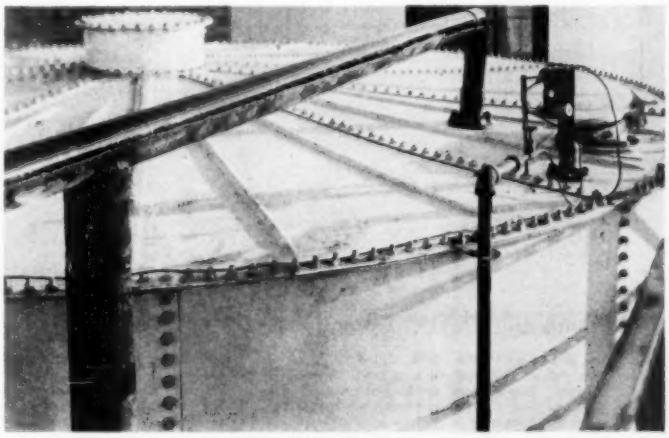
Steel and wooden tanks are employed also in the over-all water-flooding set-up but in the particular section shown here, all tanks are of plastic, made by Murdock Tank Co. of Tulsa, from glass fiber and polyester resin. All piping is also of "Cres-Line BR" plastic manufactured by Crescent Plastics, Inc., of Evansville.

Advantages . . . The advantages in having an all-plastic setup for handling corrosive fluids is readily apparent. Not only are the plastic tanks completely inert from all corrosive fluids encountered in oil-field work, but the plastic piping, which includes all ells and joints (with exception of valves) also resists corrosion, thus resulting in savings of money and maintenance.

A long-standing problem of successfully joining plastic pipe with steel valves is believed to have been solved in this installation (see photograph above right).

Frank Sevrens is lease superintendent for Superior. The plastic-tank installation was engineered by K. B. Albridge, chief tool pusher for Superior in the Owensville area.

Plastic tanks . . . Although a number of plastic tanks have been manufactured and are already in use in the Mid-Continent and in West Texas sour-crude areas, the Superior installation here employs plastic tanks for the first time in the area east of the Mississippi River.



PLASTIC TANK holds 250 bbl. of fluid. Plastic piping is used with the tanks to combat corrosion. This installation is a pilot water-flooding operation for Superior Oil Co. near Owensville, Ind.

BRACE, shown immediately above and in the foreground of the elevator substructure, is set into a mast-type derrick to hold the legs solidly in position to engage anchor footing on floor when raising the structure.

CLOSE-UP of derrick brace shown in photograph at left. Brace is placed in socket (far right) and with guide pin (left end) to hold leg in position for raising structure. This rig belongs to Brown Drilling Co., Bakersfield, Calif.

Leg spreaders save rig-up time, labor

BROWN DRILLING CO. has developed and installed leg spreaders for a mast-type derrick on a rig currently drilling in Edison field, 10 miles east of Bakersfield, Calif., to cut down on labor and rigging-up time.

The difficulty encountered when operating with an inexperienced crew was centered upon positioning the hinged braces, normally extending from the mast, backward toward the draw works where the leg anchors are placed. At the moment that the mast approached the vertical, these legs are brought outward from the mast and placed in the hinges and the pins inserted.

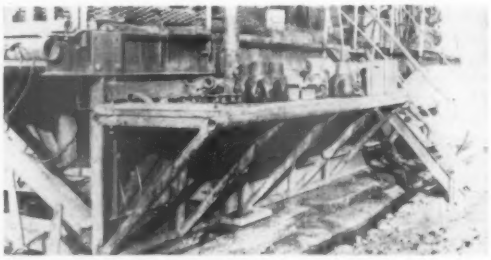
Due to haste, men would either overshoot, or otherwise miss the mark, which consumed time and effort.

Mistake remedied . . . To overcome this difficulty, a horizontal brace was developed to be inserted in a sleeve, or socket, permanently welded to the main diagonal leg of the derrick, and the opposite end, attached to a hinge-type device, welded to the brace legs.

The horizontal brace, with the attachments, was cut to an exact length so that, when the mast approached the vertical, the brace legs would automatically fit into the anchors without further exertion on the part of the crew employed for rigging up.

Telescoping Sills Prevent Tipping

To prevent tipping of certain types of jackknife mast-type derricks when raising, telescoping sills are installed in the bottom sills of the rig substructure. The sections are lengths of channel iron with an over-all width to nest between the outer flanges of the I-beams of the substructure. Retaining straps are welded from the top to the bottom flange of the sills to prevent the telescoping sections from being pushed away. In the section which carries the load at the point near the outer end of the derrick sills, the telescoping sections are reinforced with plates so they will not buckle.



Bit Dock Built Beside Rig

As an added convenience on a drilling rig, a bit dock has been devised that is readily attached to the side of the substructure with retaining clamps. The floor of the dock is covered with regulation slipproof walk material, topped with protective planking so that bits will not be damaged. The frame of the dock is a simple triangular affair with the base of the triangle supplying the floor. The side of the triangle sets squarely against the rig substructure, while the apex contains a pipe reinforcement to rest on timbers. Five brace units support the dock.

COMPRESSOR CALCULATIONS—1

Natural Gas—Critical Temperature and Pressure

by R. W. Brooks*

THE primary purpose of any compression study is the determination of horsepower per million standard cubic feet of gas compressed per day. The calculation of discharge temperatures and heat removal to attain a desired cooling after compression is next in importance. These problems may be simplified if specific heat data can be established and expressed as a function of pressure and temperature. This paper sets forth specific heat and related data for natural-gas mixtures within the operating range of pipe-line service, which should be useful in compressor-plant computation.

Edmister[1] has prepared a generalized chart of C_p/C_v data for pure hydrocarbon gases, and a number of investigators have proposed methods of adapting specific heat data at atmospheric conditions for use at higher pressures[2,3,4,5,6,7,8] so as to give calculated results more in keeping with observed horsepower requirements.

In order to establish the variation in specific heats, it is necessary to settle on a suitable equation of state. The compressibility factor Z, as defined in the equation $PV = ZRT$, is generally employed by the engineer as the most practical measurement of the nonideal behavior of a gas. Generalized curves[9] and tables[10,11] are available which express the compressibility factor as a function of the pseudo reduced pressure and temperature. The compressibility factor data chosen have been those based on Dunkle's[12] superexpansibility factors. Dunkle's work was based on experimental results obtained on natural gases with varying percentages of nitrogen and carbon dioxide.

Dunkle's method of establishing critical pressure and temperature from a knowledge of the specific gravity, heating value, and inert content requires no detailed analysis of the gas. The upper pressure limit of Dunkle's data is about 1,000 psig., a pressure that encompasses most pipe-line compression. Reduced gage pressure as set forth in Dunkle's correlation has been retained. It was necessary to convert the superexpansibility factors, Y, to compressibility factors by the relation: $Z = 1/Y$.

TABLE 1—Determination of Pseudo-Critical Temperatures and Pressures by Dunkle's Method[12]

1. Gases containing hydrocarbons only utilizing specific gravity, S, as the variable:

$$T_c = 152.5 + 345.4\,S$$
$$P_c = 685.8 - 23.1\,S$$

utilizing heating value, h, as the variable:

$$T_c = 120.0 + 0.2208\,h$$
$$P_c = 688.0 - 0.0148\,h$$

2. Gases containing hydrocarbons, carbon dioxide and nitrogen utilizing specific gravity, heating value, and mol fraction of carbon dioxide, C:

$$T_c = 128.5 + 90.1\,S + 0.1632\,h + 244\,C$$
$$P_c = 670.7 - 183.9\,S + 0.1028\,h + 683\,C$$

utilizing specific gravity, carbon dioxide and mol fraction of nitrogen, N:

$$T_c = 152.5 + 345.4\,S - 272.2\,N - 170.3\,C$$

$$P_c = 685.8 - 23.1\,S - 171.4\,N + 422.5\,C$$

utilizing heating value, carbon dioxide and nitrogen:

$$T_c = 120.0 + 0.2208\,h + 96\,N + 390\,C$$
$$P_c = 688.0 - 0.0148\,h - 196\,N + 385\,C$$

It was possible to express the compressibility factor as a function of the pseudo reduced temperature and gage pressure in the form:

$$Z = 1 - A\,p_R + 0.00605\,p_R^2 \qquad (1)$$

where A is a function of temperature:

$$A = e^x \qquad (2)$$

where:

$x = 1.163 - 2.328\,T_R$

T_R = reduced temperature = T/T_c

p_R = reduced gage pressure = p/P_c

Equation 1 is restricted to a range of p_R from 0 to 2.4 and T_R from 1.3 to 1.9. Errors of less than 0.001 result in determining Z (Z varying between 0.850 and 1.000) when suction pressures are 500 psig. or less and suction temperatures 60° F. or more. At higher pressures and lower temperatures the error becomes greater.

*Pacific Gas & Electric Co. From paper presented at Pacific Coast Gas Association conference, 1953.

References

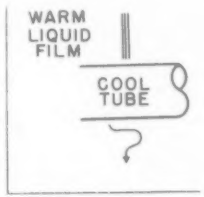
1. Edmister, W. C., Ind. Eng. Chem. 32, p. 373 (1940).
2. Clark Bros. Co., Bull. 116, "Centrifugal Compressors" (1951).
3. Edmister, W. C., Chem. Engr. Progress 47, p. 191 (1951) April.
4. Edmister, W. C., and McGarry, R. J., Chem. Engr. Progress, 45, p. 421 (1949), July.
5. Joffe, J., Chem. Engr. Progress 47, p. 80 (1951) February.
6. Koenig, C. F., III, Petr. Engr. 23, p. 624 (1951) October.
7. Ridgway, R. S., Petr. Refiner 24, p. 177 (1945) May.
8. York, R., Jr., Ind. Eng. Chem. 34, p. 535 (1942) May.
9. Brown, G. G., Proc. Natural Gas Assoc. Am. 19, p. 54 (1940) May.
10. C.N.G.A. Bull. No. TS-461, "Tentative Standard Procedure . . . Determination . . . Superexpansibility . . ." Los Angeles (1947).
11. C.N.G.A. Bull. No. TS-402, "Tentative Standard Procedure . . . Determination . . . Corrected Hourly Gas Coefficient . . ." Los Angeles (1941).
12. Dunkle, R. V., Pacific Coast Gas Assoc. Proc. 35, p. 80 (1944).

Part 31 of a series

by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a COOL TUBE and a WARM LIQUID



Tube Position: Horizontal

Liquid Movement: In layer form over tube.

EQUATION:

$$h_f = 150 \left[\frac{\Gamma}{12 D_o}\right]^{\frac{1}{3}}$$

TERMINOLOGY:

h_f - Heat transfer coefficient across film, BTU/hr. sq. ft./°F.

Γ - Mass rate of flow = W/2L

D_o - Outside diameter of tube, ft.

W - Mass rate of flow, lb./hr./tube.

L - Length of horizontal tube/ft.

LIMITATIONS:

water only

from 100 - 1000 #/hr./ft. of pipe.

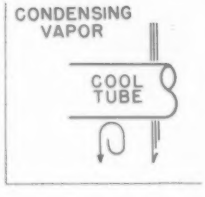
REFERENCES:

1. Trans. Am. Soc. Mech. Engrs., McAdams, Drew and Bays, 62, 627 (1940).

2. Chemical Engineers' Handbook, J. H. Perry, p. 474, (1948).

J 2 a (2)

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a COOL TUBE and a CONDENSING VAPOR



Tube Position: Horizontal

Vapor Velocity: Static to Moderate

EQUATION:

$$h_f = 0.725 \left[\frac{k^3 \rho^2 \lambda g}{D \mu \Delta t}\right]^{\frac{1}{4}}$$

TERMINOLOGY:

h_f - Mean value of film coefficient of heat transfer for entire tube, BTU/hr. sq. ft. °F.

k - Thermal conductivity of condensate film at t_f, BTU/hr. ft. °F.

ρ - Density of condensate film at t_f, lbs./cu. ft.

μ - Viscosity of condensate film at t_f, lbs./hr. ft.

D - Diameter of tube, ft.

g - Acceleration due to gravity, 4.17×10^8 ft./hr. hr.

λ - Latent heat of condensate of vapor at t_{sv}, BTU/lb.

Δt - Temperature difference between tube surface and the dew-point temperature of the vapor, °F.

t_f - Temperature of condensate film, °F.; $t_f = t_{sv} - \frac{3}{4}\Delta t$

t_{sv} Dew-point temperature of the vapor, °F.

LIMITATIONS:

Used only for film type condensation where streamline flow exists in the condensate film. Cannot be used for high vapor velocities.

SIMPLIFIED EQUATION:

for steam $$h_f = \frac{3100}{(D_o)^{\frac{1}{4}}(\Delta t)^{\frac{1}{3}}}$$

Δt from 10° to 150° F

PHYSICAL CONSTANTS: See Chemical Engineers' Handbook - J. H. Perry (1948).

for ρ -- see pp. 130-148, 178-195, 1563.
μ -- see pp. 370-374, 1106, 1696.
k -- see pp. 459-471, 1305, 1697.
λ -- see pp. 210-218, 299, 249-281, 1688.

REFERENCES:

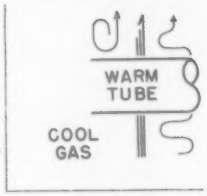
1. R. Hazelton and E. H. Baker, Vol. 40, Trans. Am. Inst. Chem. Engrs. (1944).

2. Heat Transmission, W. H. McAdams, 2nd Ed., p. 261.

3. D. F. Othmer and S. Berman, Ind. Eng. Chem., 35, (1943).

J 3

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a WARM TUBE and a COOL GAS



Tube Position: Horizontal

Gas Movement: Natural Convection
Streamline Flow
Turbulent Flow

There is no differentiation made between heating or cooling a gas in passing it over a single tube in a direction normal to the axis of the tube.

Reference should therefore be made to equations

J 1 a (1) (a)
J 1 a (1) (b)
J 1 a (1) (c)
J 1 c
J 1 b

for equations applicable to heating a gas by passing it over a horizontal tube in a direction normal to its axis.

J 4 a b c

HEATING-TUBE FAILURES—7

Failures From Metallurgical Causes

by J. J. B. Rutherford*

INSTALLMENT No. 6 dealt with oxidation. In this final installment of the series, failures due to chemical causes other than oxidation as well as metallurgical causes of failure are discussed.

Metal wastage occurs from other causes than oxidation. Any chemical reaction which converts the metal into a scale contributes to attrition. Sulfur attack or sulfidization is quite common, especially with nickel-bearing alloys exposed to gases containing H_2S. Fig. 1 is 2¼ by 220-in. Type 304 tubing after service in a catalyst cooling coil. Water was fed through the coil when the catalyst bed was too high in temperature, but otherwise the coil was dry. Water fed in through a leaky valve, evaporated, and left a salt residue which melted and attacked the metal. The chemical analysis of this salt corresponded closely to the salts used in water treating.

A very specific form of corrosion is represented in Fig. 2. This is obtained from 6-in. pipe, Type 316 (16 per cent chromium—13 per cent nickel—3 per cent molybdenum) used for cooling gases from a combustion chamber to remove SO_2. The gases, inside the pipe, start at 1,300°-1,700° F., while the outside is exposed to atmospheric conditions. At some time, presumably in intermittent service, this section of the pipe had been hot enough to obtain an intergranular precipitation of carbides, and then subsequently cold enough to obtain a sulfuric acid condensate. This combination resulted in intergranular corrosion in which the metal between the grains is completely removed. The causes and prevention of intergranular corrosion in austenitic stainless steels have been well established[1] and, as a result, this type of failure is now encountered quite infrequently.

Many of the metallurgical causes of failure in heater tubes have already been documented by the author.[2] These steels are placed in service in the annealed condition on the presumptions that this is the most stable condition; however, such is not always the case. For example, plain carbon steel and practically all the carbon-molybdenum steel, on exposure in the thousands of hours to temperatures from 800°-1,300° F., will suffer conversion of the iron carbide phase to elemental carbon, in the form of graphite. This has little effect on the properties at elevated temperatures unless the graphite occurs in continuous chain form at the grain boundaries; in which case there is a pronounced detrimental effect on ductility and resistance to impact. As an intermediate step to graphitization, the carbides will coalesce or spheroidize. This has no significant effect but does help to interpret temperature conditions during service.

On heating carbon steel to still higher temperatures than those in which spheroidization and graphitization prevail, the metal will pass through the critical or transformation range and form, in whole or in part, the high-temperature modification—austenite. This phase has higher strength and is desirable, but it only occurs at temperatures where steel rapidly wastes away by oxidation. The addition of alloying elements to steel, such as 18 per cent chromium plus 8 per cent nickel, stabilizes the austenite to lower temperatures where it is useful, and also decreases the ratio of oxidation to permit use of the metal at higher temperatures. When carbon steel has been heated to excessive temperatures to form austenite, and then cooled rapidly, the austenite transforms to martensite, the hard brittle constituent associated with hardened tool steel. A heater tube exposed to such conditions is very liable to be cracked, and, if not, must be cautiously annealed before it is returned to service. The same precautions are naturally necessary if a tube has been repaired or sealed in a header by welding.

The alloy steels which are used because of their high strength at elevated temperatures fall into two categories: (1) those which are austenitic and (2) those which are precipitation-hardened. The austenitic steels in this class are all high in chromium content and may be susceptible to sigma-phase formation. Special steels, both austenitic and ferritic, have been developed which are age-hardened or precipitation-hardened in order to acquire high strength in particular temperature ranges.

*Babcock & Wilcox Co., Tubular Products. Paper presented at John Zink Process Heating Seminar, Tulsa.

Fig. 1—Attack at inside surface by salts resulting from evaporation.

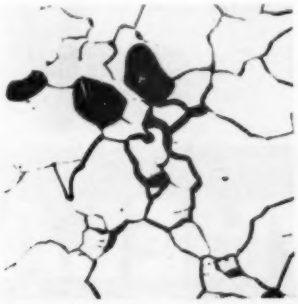


Fig. 2—Intergranular attack progressing from i.d. surface, magnified X100.

References

1. Rutherford, J. J. B., and R. H. Aborn, Trans. A.I.M.E., Vol. 100, 1932.
2. Rutherford, J. J. B., "High-Temperature Properties of Metals," American Society for Metals, Cleveland, 1951.

Rugged, Dependable

WHELAND SWIVELS

— for long, satisfactory service

Mr. Hoyt Burckhalter, Partner (left) and Mr. Guy Pruett, Tool Pusher (right) with Wheland Swivel that has run 14 months under constant operation with one wash pipe and packing.

SIKES-BURCKHALTER DRILLING CO.
WICHITA FALLS, TEXAS

March 18, 1953

The Wheland Company
Oil Field Division
Chattanooga, Tennessee

Attention: Mr. Gordon Smith

Dear Mr. Smith:

I have three rigs running in the southwestern part of Oklahoma and one in the Sandusky area near Sherman, Texas.

Our work is mostly contract work with some interest work too. We have Wheland Swivels and Rotary Tables on two of the large rigs with which we are very well pleased. One Wheland E6200 Swivel ran for 14 months in the southwestern part of Oklahoma under constant operation with one wash pipe and packing.

We are very satisfied with Wheland equipment and believe it to be the best.

Very truly yours,

Hoyt G. Burckhalter

4 WHELAND SWIVEL SIZES

Model E-6100—capacity 115,997 lbs. at 100 RPM
Model E-6200—capacity 191,424 lbs. at 100 RPM
Model E-6600—capacity 243,487 lbs. at 100 RPM
Model E-7000—capacity 326,353 lbs. at 100 RPM
(at 3,000 life hours)

Complete details on request

WHELAND

THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.
ROTARY DRILLING MACHINERY

DOMESTIC DISTRIBUTORS
Jones & Laughlin Steel Corporation
Supply Division
Tulsa, Oklahoma
Stores and Offices in all Principal Oil Fields and Centers

EXPORT DISTRIBUTORS
Lucey Export Corporation
233 Broadway,
New York 7, N. Y.
Broad Street House
London E.C. 2, England

DRAW WORKS • SLUSH PUMPS • ROTARIES • SWIVELS • CROWN BLOCKS • TRAVELING BLOCKS

by W. L. Nelson
Technical Editor

QUESTIONS ON TECHNOLOGY

This department was created for the purpose of aiding managers, superintendents, engineers, chemists, and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Effect of Charge-Stock Viscosity of Cracking Yields

"We have followed with considerable interest your recent articles relating to visbreaking of reduced crudes and residuums. What would be the approximate gravities of the fuel oils produced when cracking 14 A.P.I. paraffinic (11.9 characterization factor) residuum and when cracking 14 A.P.I. naphthenic (11.4 factor) residuum to a 300 Furol at 122° F. fuel oil? The Furol viscosities of the stocks are 136 and 263 seconds at 210° F. for the paraffinic and naphthenic materials respectively."—W.R.J.

The viscosities of the two charge stocks are about (Viscosity at 122° F., The Oil and Gas Journal, May 5, 1952, page 287):

Paraffinic—2,700 Furol at 122° F.
Naphthenic—15,000 Furol at 122° F.

If the two stocks were both of the same base (i.e., both paraffinic or both naphthenic) you would expect a 9 per cent smaller yield when cracking the more viscous stock. However, naphthenic stocks can be cracked to lower gravity fuel oils than paraffinic ones, and hence you could expect the following gravities of fuel oil (see Yields in Viscosity Breaking—Part 2, The Oil and Gas Journal, March 24, 1952, page 208):

Paraffinic—9-11 A.P.I. fuel
Naphthenic—5-7 A.P.I. fuel

The decrease in fuel gravity would just about counterbalance the greater viscosity of the naphthenic feed. According to "Yields in Noncoking Thermal Cracking," The Oil and Gas Journal, February 25, 1952, page 183, and yield when producing a 6° A.P.I. fuel oil will be about 9 per cent greater than the yield when producing only a 10° A.P.I. fuel oil.

Doubling the viscosity of the charge stock causes a decrease in yield of 3 to 6 per cent. It is not, however, a uniform relationship. Thus, Table 1 shows that the effect of viscosity is greater when producing low-viscosity fuel oils and that the effect of charge-stock viscosity is not as large when in the highest ranges of viscosity.

TABLE 1
Approximate Decrease in Cracking Yield Caused by Doubling the Viscosity (at 122° or 130° F.) of the Feed Stock*

Furol vis. at 122° or 130° F.	Producing fuel oils having viscosities Furol at 122° F. of: 100 sec.	300 sec.	1,000 sec.
200- 400	9	6	4
400- 800	8	6	4
800- 1,600		5	4
1,600- 3,200		5	4
3,200- 6,400		4	3
6,400-12,800		4	3
12,800-25,600			3

*Applies only to feed stocks of the same "base" of oil.

This same general effect of viscosity of charge stock can be seen in the chart of Mithoff, MacPherson & Sipos (The Oil and Gas Journal, November 6, 1941, page 81) but their chart does not extend to the high viscosities considered herein.

Effect of Operating Conditions on Sulfur In Catalytic Products

"What is the effect of operating temperature on the sulfur content of catalytic gasoline, and on the amount of hydrogen sulfide in the gas?"—S.W.P.

A complete survey is not available but the results of one set of runs is presented by Schall and Dart, "Catalytic Cracking of High-Nitrogen Charge Stock," Third World Petroleum Congress, 1951, Section IV, page 106. However, the results are said to be similar to those of other investigators.

Sulfur distribution among the products appears to be independent of the catalyst-to-oil ratio and the recycle ratio. Percentage conversion has little effect on the amount of sulfur in the gasoline but it affects the sulfur content of the other products as shown in Table 1.

The charge stock was a 21.2° A.P.I. gas oil that contained 1.13 per cent sulfur and 0.4 per cent nitrogen. Similar information is given regarding the distribution of nitrogen in the products.

TABLE 1—WEIGHT PER CENT OF CHARGE-STOCK SULFUR IN CRACKED PRODUCTS

Conversion, volume per cent	36		46		56	
Cracking temperature, °F.	900	950-970	900	950-970	900	950-970
Per cent charge sulfur in:						
Gas	42.5	42.5	44.5	44.5	46.5	46.5
Gasoline	8.5		8.5	10.5	8.5	10.5
Cycle oil	41.0		35.0	38.0	28.0	32.0
Coke	8.0		12.5	6.5	17.0	11.5

What's NEW

In Perforating, Logging, and Fishing Tool Services

McCULLOUGH
NEW SERVICES • NEW TOOLS
NEW WAYS OF DOING THINGS

Latest News About New Tools, Techniques and Services

MORE OIL

McCullough Announces Improved Perforators Get Up To

25% MORE PENETRATION!

McCULLOUGH PERFORATOR	ONE STRING AND CEMENT TARGET	TWO STRINGS AND CEMENT TARGET	THREE STRINGS AND CEMENT TARGET	SOLID STEEL TARGET
**STANDARD CASING GLASS JET	7-1 8″	6-13 16″	6-1 8″	3-3 4″
3-½″ O.D. *M-3 BURRLESS BULLET	9-1 2″	6-11 16″	4-11 16″	1-7 16″
**SUPER CASING GLASS JET	8-1 2″	8-1 8″	7-5 16″	4-3 4″
4-¼″ O.D. *M-3 BURRLESS BULLET	10-3 4″	8-1 16″	6-1 16″	1-9 16″
**SUPER FORMATION GLASS JET	9-3 4″	9-3 16″	8-1 4″	5-3 4″
4-¾″ O.D. *M-3 BURRLESS BULLET	11-7 8″	9-1 16″	6-13 16″	1-5 8″

*McCULLOUGH M-3 BULLET PERFORATOR. An improved bullet perforator—the only perforator known that can outshoot the jet perforator in a single string target. Proved the hardest shooting perforator in the world under normal well and formation conditions—with burrfree holes to boot!

**McCULLOUGH GLASS JET PERFORATOR. Now in three sizes to meet every perforating problem. Hardest shooting perforator in the world when the going gets tough—in hard formations, two and three strings of casing, etc. Produces straighter sided holes and the only jet perforator that does not leave a slug of metal to plug the hole.

AVAILABILITY. Every McCullough branch has these improved McCullough Perforators. Call your McCullough Service Engineer today.

SERVICE HEADQUARTERS: Los Angeles and Houston, U.S.A.; Edmonton, Canada; Service Branches in Principal Oil Fields

FOR DETAILS

WRITE FOR THIS BOOKLET

McCULLOUGH TOOL COMPANY OGA
5820 So. Alameda Street
Los Angeles 58, California

Gentlemen:
Please send me my free copy of "How To Get More Oil" by return mail.

NAME .....
COMPANY .....
ADDRESS ..... CITY ..... STATE
POSITION .....

Solution Concentration Controller

by Porter Hart* and R. C. King†

VERY little has been done to automatically control continuous evaporators for concentrating solutions of chemicals. Normally, there are two primary conditions, pressure and temperature, which affect the concentration of the final product.

A very satisfactory control system was set up in which a pressure transmitter pneumatically set a temperature controller. With this system, the temperature recording controller did not give a straight-line record for a given concentration. This changing temperature record proved confusing to the operators even though the product concentration was constant. They were constantly referring to the temperature-pressure charts to determine that the evaporator effluent concentration was correct. Additional confusion resulted when it was desired to change the evaporator operation in order to produce a different effluent concentration.

* Superintendent, Instrumentation, and †Assistant Superintendent Instrumentation, Dow Chemical Co., Freeport, Tex. Presented at symposium on Instrumentation for the Process Industries, A. & M. College of Texas, 1953.

By a simple change in the existing instrumentation, shown in Fig. 1, the recording temperature controller was converted into a recording concentration controller. This instrument gives a straight-line chart record for a given concentration even though the evaporator pressure does change.

The pneumatic set temperature controller was converted to a standard recording receiver controller. The outputs from the pressure and temperature transmitters were fed into an averaging relay. The output of the relay in turn was fed to the recording receiver controller. The ranges of both the pressure and temperature transmitters must be properly chosen, so that the output of the averaging relay falls on the solution concentration curve.

Suppose, for example, the evaporator is operating on a solution which has a linear pressure-temperature relation for various concentrations (see Figure 2). The temperature transmitter has a 3-15-psi. air output over a range of 100°-148° C. The pressure transmitter has a 3-15-psi. air output over a range of 20-26-in. Hg. vacuum. The solution concentration range for the specified pressure and temperature ranges is 22 to 28 per cent. Now for any point on any particular concentration line, the sum of temperature and pressure transmitted air pressures divided by two is a constant. Thus, the concentration recorder produces a straight line for any given concentration regardless of temperature or pressure variations.

It should be pointed out that the calibration of the concentration recorder can be only an approximation for most solutions. This is because the pressure - temperature curves for various concentrations of solutions are not linear and do not have the same slope. However, for the narrow span generally required for such applications, the calibration can be made very close. The changes made in this system, giving a straight-line control for a given concentration, have proved a great boon to the operators.

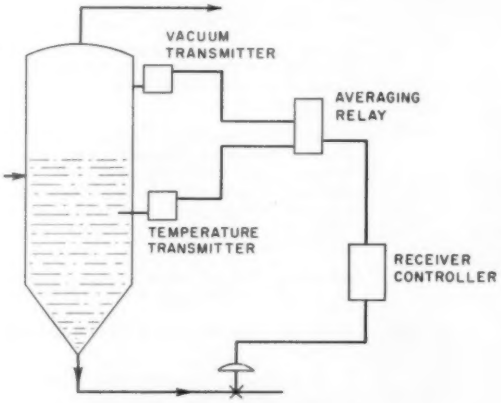


Fig. 1—Concentration control system.

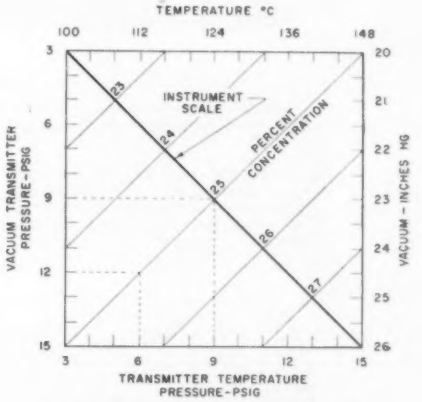


Fig. 2—Pressure-temperature concentration chart.

IMPORTANT DATA FOR WELDING ROD PURCHASERS

WELD-O-GRAM

SUPPLIED BY A. O. SMITH FOR IMMEDIATE RELEASE

IN COMPETITIVE TESTS RADIOGRAPHS OF 50,000 WELDED JOINTS IN CROSS COUNTRY PIPE LINE PROVE SW-80 ELECTRODE CUTS REJECTS IN HALF

Made by the world's largest manufacturer of transmission line pipe and casing.

SW-80

A new, E-7010 Electrode for field welding of line pipe. Just one electrode for stringer, hot, filler and finish passes. Same strength throughout. Easy to manipulate. Deposited weld metal is superior in strength and ductility.

HERE'S THE STORY...

Radiographic inspection of 50,000 joints was made during construction of a major transmission main.

One-fourth of the inspected welds were made with the A. O. Smith SW-80 rod. Rejections were only 1%. Rejections among the rest of the welds made with competitive rods were *more than* 2%.

In other words more than twice as many joints welded with competing rods were rejected as compared with those welded with the SW-80.

If all joints had been welded with the A. O. Smith pipe line electrode, rejects would have been cut by 500. This could conceivably yield a saving that would more than repay total expenditures for electrodes used on the entire pipe line comprising approximately 200,000 joints.

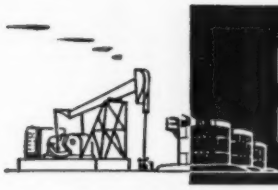
No wonder the new SW-80 electrode is gaining acceptance all along the line!

Write for free pocket-size electrode handbook.

A. O. Smith Corporation, Dept. OG-453
Milwaukee 1, Wisconsin
International Division, Milwaukee 1

A.O.Smith
WELDING PRODUCTS

Made by welders . . . for welders



ENGINEERING FUNDAMENTALS

Optimum Separator Pressures

by Ralph F. Nielsen*

THE separation of oil from its associated gas is often done in stages, in particular when well-head pressures are high. Such multistage separation was discussed in an earlier number of this series.[1] The greater the separator pressure, the less the amount of light liquids removed by the gas. However, if the pressure in the first stage is too high, the amount of gas removed will be small, and therefore more gas must be removed at lower pressures where it will sweep out more of the light liquids. There is an optimum series of pressures, or optimum intermediate pressure in the case of two-stage separation, which will give the largest volume of stock-tank oil for a given amount of reservoir oil. That is, under the optimum conditions of separation the least amount of light liquid hydrocarbons will be lost in the gas.

The usual field separation of gas and liquid approximates a continuous "flash" process since the two phases are in contact just after passing the throttling valve. The calculation of the amounts and compositions of the phases for such a process has been described in earlier numbers of this series.[2] Electric analog computers[3] are sometimes used. To find the optimum separator pressures a series of such calculations must be made assuming various pressures, to see which conditions give the maximum stock-tank liquid volume.

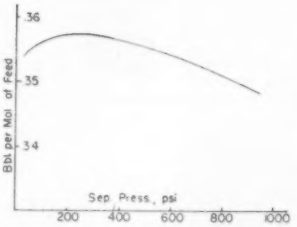


Fig. 1—Effect of first-stage separator pressure on volume of stock-tank oil for two-stage separation.

A calculation for two stages of separation (the second being atmospheric) is shown in Table 1. The number of mols L of liquid obtained from a mol of feed must be found by trial and error. The table shows only the correct "guess." The equilibrium constants were taken from tables, assuming the first stage to be at 80° F. and 300 psia. and the second stage to be atmospheric at 70° F. The feed composition must be known from laboratory analyses. Molal volumes can be obtained from tables, except the value for "heptanes plus" which must be determined in the laboratory. A series of calculations similar to that of Table 1 must be made. The volume of atmospheric liquid per mol of feed can then be plotted against the separator pressure, and the optimum determined (Fig. 1). This optimum will in general be different for different feed compositions.

The volumes obtained will not be quite correct in the absolute sense. However, essentially the same error will be made in all calculations of the series, so that this absolute error will not appreciably affect the optimum pressure obtained. Likewise, the molal volume of "heptanes plus" does not have to be known accurately.

*Associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

References

1. J. C. Calhoun, Concept of Two-Stage Separation, The Oil and Gas Journal, October 13, 1949, p. 137.

2. J. C. Calhoun, Calculation of Phase Separation, The Oil and Gas Journal, September 1, 1949, p. 73.

3. R. F. Nielsen, Electric Analog Computers for Phase Equilibrium Calculation, The Oil and Gas Journal, December 29, 1952, p. 97.

TABLE 1—CALCULATION OF VOLUME OF STOCK-TANK OIL PER MOL OF FEED FOR TWO-STAGE SEPARATION

Component—	Mol fraction in feed = X	K (300 lb.)	L + VK 0.63 + 0.37K	X/(L + VK) = x_1	K (15 lb.)	L + VK 0.84 + 0.16K	x_1/(L + VK) = x_2	Molal vol. (bbl.)	$x_2 \times$ M.V.
Methane	.3708	12.5	5.255	.0706	240	39.2	.0018	.183	.0003
Ethane	.0534	1.8	1.296	.0412	30	5.64	.0073	.228	.0017
Propane	.0377	.52	.822	.0458	8	2.12	.0216	.245	.0051
Butanes	.0424	.19	.700	.0605	2	1.16	.0522	.284	.0148
Pentanes	.0376	.06	.652	.0576	0.7	.952	.0605	.326	.0197
Hexanes	.0488	.023	.638	.0764	0.25	.880	.0868	.370	.0321
Heptanes plus	.4093	.004	.6315	.6479	0.01	.8416	.7698	.780	.6004
	1.0000			1.0000			1.0000		0.6741

Barrel stock-tank oil per mol of feed = 0.63 × 0.84 × 0.6741 = 0.356.

name your tubing need...

HYDRIL Tubing Joints *are the answer!*

All Hydril Tubing Joints give extra clearance — permit running strings one inside the other or side-by-side in liners.

Extra deep, high pressure or corrosive conditions?

HYDRIL Type CS: Joint is pressure-tight even on extra deep high-pressure applications. Extra torque capacity . . . extra tension strength.

Able to "work" as well as produce?

HYDRIL Type C-100: Rugged pressure-tight joint. Heavy upset serves as a shoulder for elevators. Offers dual-purpose use for limited drilling as well as production.

Standard upset with streamlined advantages?

HYDRIL Type A: For standard API upset tubing. Extra clearance provided by absence of coupling plus streamlined joints.

For more detailed information, contact your nearest Hydril representative.

HYDRIL COMPANY

General Offices: 714 W. Olympic Blvd., Los Angeles 15, Calif.
Factories at Los Angeles; Houston, Texas; Youngstown, Ohio; Rochester, Pa.

Sales Offices: **CALIFORNIA** — Avenal, Bakersfield, Los Angeles, Ventura; **LOUISIANA** — Harvey, New Iberia; **OHIO** — Youngstown; **OKLAHOMA** — Tulsa; **PENNSYLVANIA** — Rochester; **TEXAS** — Corpus Christi, Dallas, Houston, Midland, Odessa; **WYOMING** — Casper; **CANADA** — Calgary, Edmonton

SEE HYDRIL AT THE OIL SHOW IN TULSA!
Hobbs St., between Fitts and Oklahoma Ave. — May 14-23, 1953

MODERN DRILLING

Requirements of Casing Cement for Segregating Fluid-Bearing Formations

by **Roscoe C. Clark, Jr.***

THE reasons for cementing casing in oil and gas wells are numerous; however these reasons can be divided generally into two broad classifications:

1. To firmly anchor or support the casing in the hole.
2. To segregate the formations adjacent to the hole in order to prevent migration of fluids from one zone to another.

The cement requirements for supporting casing have been adequately covered by R. F. Farris,[1] who has presented data to show that 8-psi. tensile strength would, under normal operating conditions, indicate a capability of the cement for supporting the casing. It is the purpose of this article to present data which can be used in the design of casing cementing operations in the light of obtaining adequate segregation of formations.

Procedure . . . Laboratory tests have been conducted in an effort to correlate tensile strengths of oil-well cements with the ability of the cement to bond to formation and casing, in order to prevent the migration of fluids outside the casing.

Apparatus used in these tests is illustrated in Fig. 1. It consists essentially of a 1-in. pipe nipple filled with the cement being treated, connected in the middle to a source of water which is forced under pressure against the sides of the cement column. The apparatus was constructed to simulate well conditions wherein a cement column is exposed to a permeable formation containing fluids.

The tests were conducted by filling a number of test nipples, tensile molds, and a Hassler-type holder with (1) neat cement, (2) cement containing bentonite, and (3) cement containing bentonite and expanded perlite.

These cements were cured for various lengths of time, after which the tensile strength, the amount of water which would pass through the test nipple, and the permeability of the cement in the Hassler holder were measured. Another test was conducted in a test nipple wherein water was forced through the nipple when the cement had attained a tensile strength of 8 psi. Water injection was then maintained continuously as the cement gained strength, and injection rates were determined periodically until the cement had developed a tensile strength of 116 psi. Each time an injection rate was measured the tensile strength of the cement in the nipple was also measured, using briquettes obtained from the original sample.

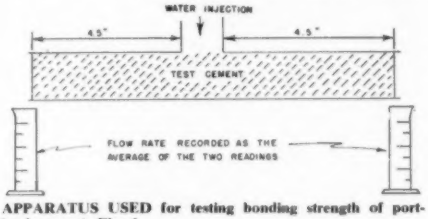
Results . . . Data for all tests are presented in Fig. 2. In Fig. 2 it can be seen that the ability of the cement to bond to the pipe can be correlated with the tensile strength of the cement, whether or not additives were used in the slurries.

In Fig. 2 the amount of water flowing between the cement and the pipe is illustrated by the difference in the two curves, since the lower curve illustrates the quantity of water flowing through the permeability of the cement.

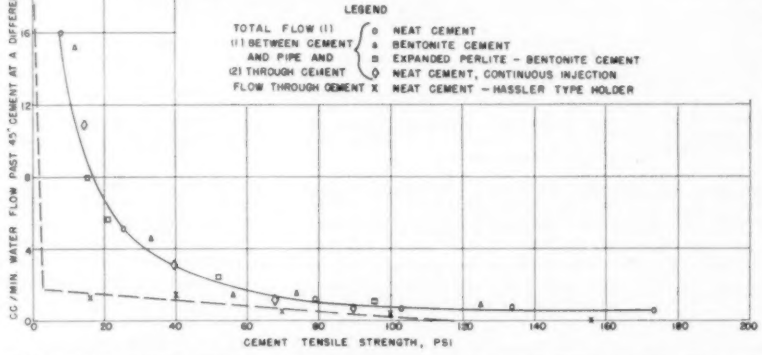
Conclusions . . . These findings are indicated from the data presented in Fig. 2:

1. The optimum tensile strength considering formation segregation is approximately 50 psi.
2. Maximum bonding ability occurs at approximately 100 psi. tensile strength.
3. During the development of strength in the cement, some flow may occur between fluid-bearing formations; however, unless channeling is produced in the cement by the flow, subsequent strength development will be accompanied by increased bonding to the formation, retarding or preventing further fluid migration.

The data obtained in these tests are representative of what might be expected to occur in a hole where the mud filter cake has been removed using scratchers and centralizers. Considerably more channeling should occur if the mud filter cake is not removed; however, in this case the amount of fluid flow should not be a function of cement strength.



APPARATUS USED for testing bonding strength of portland cement. Fig. 1.



COMPARISON of tensile strength and bonding ability of portland cement. (Water rate was 161 cc. per minute at 0 psi. tensile strength.) Fig. 2.

Bibliography

1. Farris, R. F., "Method for Determining Minimum Waiting-on-Cement Time," A.I.M.E. Technical Publication No. 1968.

*Research group leader, production research division, development and research department, Continental Oil Co., Ponca City, Okla.

EQUIPMENT MEN . . . in the News

Schoen Made Vice President, General Sales Manager

J. W. SCHOEN

Officials of R. G. LeTourneau, Inc., recently announced the appointment of John W. Schoen as vice president and general sales manager. Schoen will direct the company's sales division as well as other related departments. He brings to LeTourneau extensive knowledge of business administration and practical experience in the construction-equipment industry.

Schoen was formerly associated with LaPlante Choate Co., a Cedar Rapids, Iowa, manufacturer of construction machinery, where he rose to vice president in charge of sales, a position he held for the past 4 years. Early this year Allis-Chalmers Manufacturing Co. acquired the LaPlante-Choate properties, and Schoen resigned to become consultant for David Brown Industries, a British manufacturer of construction machinery and agricultural equipment. He replaces R. E. McCluskey, who recently resigned from LeTourneau.

Orbit Valve Appoints Canadian Representative

T. R. PICKFORD

Tom R. Pickford has been appointed to represent Orbit Valve Co., Tulsa, in the provinces of Alberta, Saskatchewan, British Columbia, and Manitoba in Western Canada.

Pickford, who will headquarter at Calgary, was formerly associated with Oil Equipment, Ltd., a Canadian supply company.

According to R. G. Cole, general sales manager for Orbit Valve, Pickford assumed his new position April 1.

Bethlehem Supply Opens Sales Office in Denver

Bethlehem Supply Co. has announced the opening of a new sales office in Denver. R. R. Estes, formerly at Casper, Wyo., will be special representative in charge of the new office, which will be under the direct supervision of E. S. Lewis, Rocky Mountain district manager.

Bethlehem has opened this new sales office better to provide sales coverage to the increasing number of oil-company offices being established in Denver.

Kenan Named to New Post in Koppers Tar Products Div.

Appointment of R. C. Kenan as assistant sales manager of midwestern district of Tar products division of Koppers Co., Inc., was recently announced by J. C. Macon, sales manager of the division.

Kenan joined Koppers as a cadet in the tar-products division in 1936, and he worked in the production planning department from 1938 to 1942. He was named administrative assistant to the sales manager in 1949 and held this post until 1952 when he was transferred to the hot-applied-coatings section of the midwestern sales district.

C. N. Page Named By Continental Geophysical Co.

C. Newton Page has recently resigned as seismologist for Honolulu Oil Corp., Midland, Tex., to become associated with Continental Geophysical Co. of Fort Worth. Page will supervise the company's operations in West Texas and New Mexico.

Page received his geological engineering degree from Colorado School of Mines in 1942, and from then until 1948 he served with Seismograph Service Corp. in Illinois, Kansas, Oklahoma, Venezuela, Texas, and New Mexico on both reflection and refraction seismograph parties. The next 4 years were spent as seismologist for Honolulu Oil Corp. supervising crews operating in its Mid-Continent division.

Rector Well Annual Sales Meeting Held in Fort Worth

In attendance at the annual sales meeting of Rector Well Equipment Co., Inc., were, back row: Wallace R. Tipsword; R. B. Yanaway; George H. Stewart; W. M. Counts; Miss Winifred A. Roberts; J. L. Pinkard; Mrs. Dorothy Johnston; Mrs. Carmen Hudson; Howard M. Johnson; Frank Blanton; George Warren; Charles W. Zartman; Jim E. Edwards; and Gordon McHan. Center row, seated: Myrl O. Andrews; John L. Curry; L. L. Rector; R. V. Evridge; Blake Fisher; W. P. Knight; C. L. Cron; M. C. Davis. Front row: Marshall Kestler; John P. Scott; C. D. McDonald; A. J. LaBate; G. M. Robinson; James Garrison; F. L. Rathert, and Gilbert A. Lastrapes, Jr.

Rector Well Equipment Co., Inc., recently held its annual sales meeting in the company's home office in Fort Worth. The meeting was hightlighted by discussion of new products and improvements to existing products developed during the past year. One of these new products is the slip packoff assembly, which has undergone field and laboratory tests during the past year. This new assembly, which can be wrapped around the pipe and lowered through the blowout preventer, sets and seals simultaneously. It has been designed for use in the Rector Type RH casing head.

Product improvements discussed at the meeting were the ram plug valve, which permits shutting off the well with the Rector round ram tubing head when the tubing is out of the hole. Successful and efficient stage-cementing operations with the Rector Fulbore cementing method and cementing head were also discussed.

National Tube Division Promotes A. F. Kritscher

Appointment of Andrew F. Kritscher as assistant chief engineer-process development of National Tube Division, U. S. Steel Corp., was recently announced by L. V. Johnson, chief engineer.

A. F. KRITSCHER

Kritscher graduated from Carnegie Institute of Technology in 1937, and the same year began his employment with U. S. Steel as a student engineer at the Ellwood City Works of National Tube. He progressed through a number of operating and engineering positions at that plant, and in 1945 he was transferred to the division's Pittsburgh office as staff engineer. In 1951 he was made development engineer, a position Kritscher held until his present appointment.

Third Generation Assumes Helm of Ensign Carburetor

Paul W. Ensign, president of Ensign Carburetor Co., has announced that the third generation of Ensigns have assumed positions of responsibility after their association wtih the company for over 12 years.

Robert P. Ensign has been appointed vice president in charge of sales. Harold W. Ensign has been made assistant chief engineer, and Roy K. Ensign holds the position of development engineer. Robert and Harold W. Ensign are the sons of Paul W. Ensign, president, and Roy K. Ensign is the son of Roy F. Ensign, secretary-treasurer of the company.

The company, founded by O. H. Ensign in 1911, is a leading manufacturer in the manufacture of carburetors and gas-pressure regulators for natural-gas and butane-propane fuels.

National Plans Extension of Casper, Wyo., Facilities

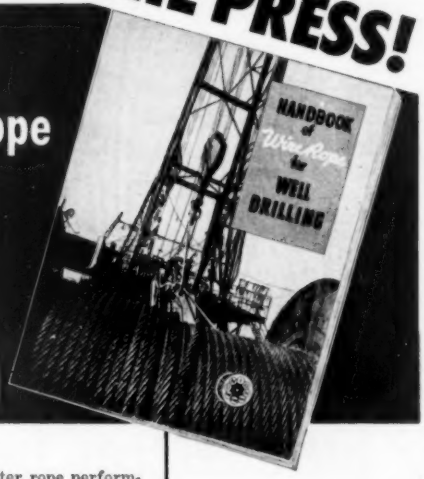
Expansion of facilities to provide a concentration point for a wide range of oil-field machinery and equipment is planned by The National Supply Co. at Casper, Wyo. This expansion will enable the company better to serve its eight other stores in the Northwest division. These are at Cody and Rock Springs, Wyo.; Glendive and Kevin, Mont.; Williston, N. D.; Craig, Colo.; Farmington, N. M.; and Stanley, Neb.

As an additional administrative

NEW!

JUST OFF THE PRESS!

Handbook of Wire Rope for Well Drilling



Cut rope costs—get better rope performance with this up-to-date, factual new handbook! Here is all the latest information, gathered by experts and graphically illustrated, on:

• Drilling (cable tool, rotary, exploratory) • Cut-Off Procedures • Oilfield Rigs • Improving Ton Mileage • Correct Handling, Field Care and Use of Wire Rope.

Send for your FREE copy now!

Tuffy® Rotary Lines are Specially Constructed for Standard Jackknife Rigs

Special steels and a unique construction give Tuffy Rotary Lines extra resistance to drum crushing, shock loads and the internal friction that cause rope fatigue. Put Tuffy to the test! See how much you can save on wire rope costs!

Mail Coupon for FREE Handbook and FREE Ton-Mile Indicator

Get Your FREE TON-MILE INDICATOR

Avoid wasting or overloading lines by measuring the work your line has done. Easy to use.

union Wire Rope **corporation**

Specialists In Wire Rope and Braided Wire Fabric

2102 Manchester Ave., Kansas City 3, Mo.

☐ Please have a Union Fieldman deliver my FREE Ton-Mile Indicator and Union Log Book and explain its use.

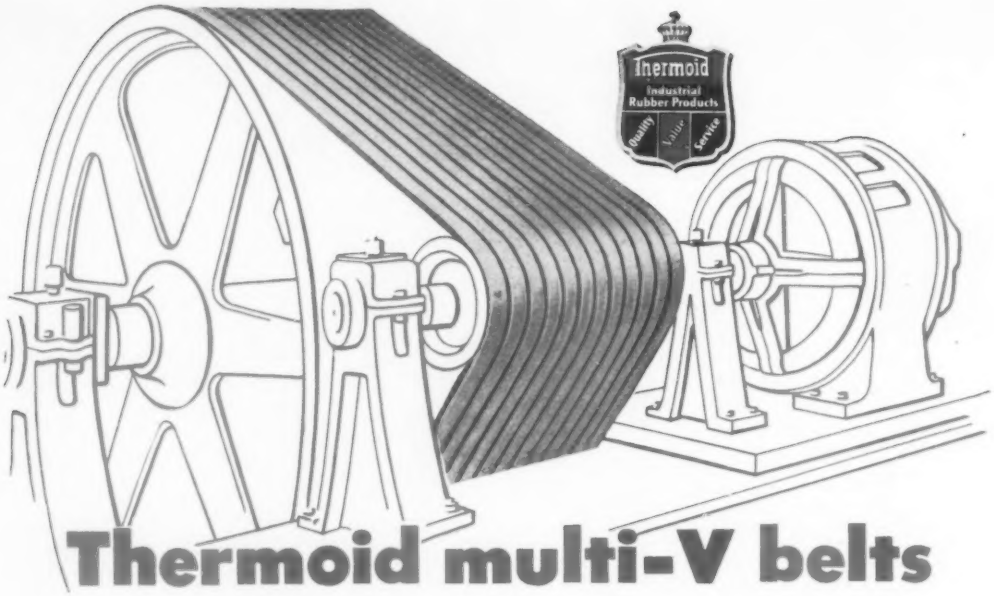
☐ Please send FREE copy of "Handbook of Wire Rope for Well Drilling."

Firm Name_____

By_____ Title_____

Address_____ City_____ State_____

O-5



Thermoid multi-V belts

pre-stretched for non-slip performance

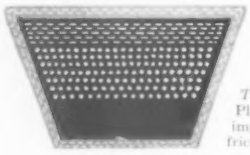
When you use Thermoid *Pre-stretched* Multi-V Belts, you can be sure of maximum power transmission, economical non-slip performance and extra long belt life.

Thermoid Multi-V Belts withstand moisture, abrasion and repeated shock loads.

They're built to take it—specially designed to resist internal friction and heat.

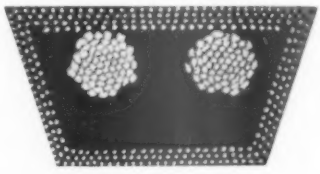
Your Thermoid Distributor can help you with power transmission problems, whether you use Multi-V, F.H.P. or Flat Transmission Belts.

It pays to specify Thermoid.



Thermoid A, B and C Sections
Plied cord construction, latex impregnated to reduce internal friction and heat build up.

Thermoid D and E Sections
Grommet type construction assures lower permanent stretch, greater flexing ability and shock absorption.



Mid-Continent Office and Warehouse: Houston, Texas
California Office and Warehouse: Los Angeles, Cal.

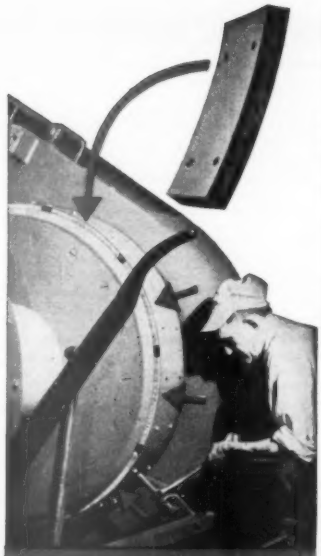
SEE OUR CATALOG IN THE COMPOSITE CATALOG

Powerflex Rotary Hose • Trioflex Slim-Hole Rotary Hose • Mud-Flo Slush Pump Hose • Flexible Discharge Units • F.H.P. and Multiple V-Belts • Oil Country Flat Belting

Thermoid

Wire Line Turn Backs • No-Wip Line Savers • Stuffing Box Rings • All Types of Hose • Molded Specialties • Brake Blocks

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



for round the clock operation choose Thermoid

Emsco Drawworks represent the most advanced engineering design for continuous drilling. These units operate 24 hours a day, seven days a week, under highly severe conditions.

Small wonder that Thermoid TX Oil Field Woven Brake Blocks are original equipment on Emsco Drawworks. Thermoid makes Brake Blocks that provide reliable performance and uniform friction. Long wear cuts down change-overs which cost valuable operating time.

Thermoid has 70 years of experience in the field of friction materials for a wide variety of industries: petroleum, automotive, transportation, agriculture and others. This experience, plus close attention to individual manufacturers' needs, is your assurance of safer, longer brake life . . . less maintenance cost . . . with Thermoid TX Oil Field Woven Brake Blocks.

Mid-continent Offices and Warehouse
Houston, Texas

Thermoid

Thermoid Company, Trenton, N. J.

change, National has moved its Northwest division headquarters from Casper to Denver. J. W. Gillespie, division manager; Robert D. Stottlemyer, assistant division manager; A. A. Anderson, division sales manager, and R. K. Ford, division merchandising supervisor, will be affected by the move.

Gardner-Denver to Occupy New Tulsa Office, Warehouse

The first lease in a 100-acre Tulsa industrial development was signed recently for a new building now under construction for Tulsa branch office of Gardner-Denver Co., Quincy, Ill., according to an announcement from G. V. Leece, Gardner-Denver vice president and general sales manager.

C. M. McKey, Gardner-Denver district manager in Tulsa, advises that the new building will include an attractive display room as well as district office and warehouse space. It will be a one-story 50-by-100-ft. concrete-block structure. The 5,000 sq. ft. is nearly double the space now occupied by the Tulsa branch, and will enable the company to offer better service to its customers in the Tulsa area.

Bell Named Sales Manager For Republic Flow Meters

Appointment of Thomas E. Bell as sales manager for Republic Flow Meters Co. has been announced by George S. Hendrickson, vice president. Bell joined Republic organization in 1925 following his graduation from Georgia Tech with a B.S. degree in engineering. For the past 20 years Bell has been manager of the southern territory with headquarters in Atlanta. Previous to moving to Atlanta, he spent several years in Chicago, Pittsburgh, and Cincinnati district offices.

Thomas Waldrop has been appointed to fill the vacancy left by Bell, and will become manager of the Atlanta office. Waldrop is a graduate of Alabama Polytechnic Institute, and joined Republic's Atlanta office staff in January 1951. Before joining Republic he was with Babcock & Wilcox Co.

Bendix Radio Mobile Sales Names Sales Appointments

Appointment of Newton O. Rogers, of Dallas, as communications engineer to handle the sale of Bendix Radio mobile equipment in Texas, Oklahoma, Louisiana, Arkansas, and Mississippi was made recently by L. J. Straw, manager of general mobile sales of Bendix radio communications division. Straw also announced the appointment of Gerald Klugerman, of Miami, Fla., to handle sales of the company's mobile radio equipment in South Carolina, Tennessee, northern Georgia, and northern Alabama. Both men will concentrate on sale and promotion of two-way mobile radio equipment for any type of individual and organizational installation.

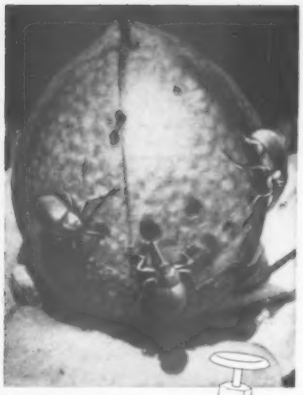
In an additional release, Straw announced the appointment of H. Martin Gillmon, of Baltimore, as communications engineer for Bendix Radio communications division to handle sale of mobile radio equipment. Gillman has been assigned a territory which includes North Carolina, most of Virginia, and the greater part of West Virginia, not including the Wheeling area.

United States Steel to Construct Research Center

New research center planned by United States Steel Corp.

An entirely new research center for developing new and better steels will be constructed by United States Steel Corp., it was announced recently by Benjamin F. Fairless, chairman of the board. The center will be located in a rural area of Allegheny County near Pittsburgh. The new center will be devoted primarily to applied research and to better coordination of the many research projects which already are under way in United States Steel. Fairless stated that the new center will be of great assistance in carrying out U. S. Steel's expanding research program, which is devoted to many studies important to national defense, including increasing production in existing plants.

The proposed center will consist of three buildings with a combined floor area of approximately 132,000 sq. ft., a main laboratory building, an experimental shop, and an industrial process development building.



FOILING THE BEETLE WITH THE *half-billion bite!*

$500,000,000. That's what the boll weevil cost America in 1950. This is probably the most destructive of all insect pests, and does such a thorough job of ruining cotton crops that it has forced large agricultural areas to abandon the growing of cotton altogether. Today, we have a new and effective weapon against boll weevils, the insecticide BHC (benzene hexachloride).

BHC is produced by the controlled chlorination of benzene by means of a catalyst. Its large-scale commercial production is made more difficult by the corrosiveness of its basic ingredients. To handle these corrosives effectively, the leading processors of BHC use ALOYCO valves, as do so many other manufacturers of DDT, and older insecticides.

ALOYCO valves are supplied in stainless steel and other corrosion-resistant alloys by the Alloy Steel Products Company, Inc., the world's largest specialists in valves for corrosive service. Such specialization has developed a practical knowledge of the chemistry of corrosion, and produced the metallurgical and mechanical know-how to combat it.

If corrosives play a part in your business, get in touch with us about your own valve needs.

ALLOY STEEL PRODUCTS CO., INC.
1314 West Elizabeth Avenue, Linden, N. J.
3.12

Pipe-Line Construction

PIPE-LINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipe-line companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the company name.

Crude-Oil Pipe Lines

• **California-Oregon Pipe Line System**—103 miles, 6-in., proposed, Crescent City, Calif., to Medford, Oregon.

• **Cities Service Pipe Line Co.**—64 miles, 18-in., under way, Sour Lake, Tex., to Lake Charles, La. Associated Pipe Line, contractors. Completion date April 1953.

Cooperative Refinery Association.—48 miles 6-in., under way, Phillipsburg, Kans., to Holdredge, Neb.

• **R. A. Goodall.**—45 miles, 6-in., planned, Little Beaver to Merino, Colo. (To connect with Sterling system).

• **Gulf Oil Co.**—22 miles, 8-in., planned, Portilla field, Texas, to Corpus Christi.

• **Gulf Refining Co.**—55 miles, 10-in., planned, Bay Marchand to Plaquemines, La.

• **Humble Pipe Line Co.**—71 miles, 16-18-in., planned, East Texas to Louisiana-Texas border. (30 miles of 16-in., and 41 miles of 18-in.) Completion date 10-53.

Under way, Hawkins field, Woods County, Texas, to Longview.

Start 7-1, Longview to Louisiana border.

• **Interstate Oil Pipe Line Co.**—137.6 miles, 22-in., planned, Shreveport to Baton Rouge, La.

Interstate Oil Pipe Line Co.—68 miles, 16-in., under way, Raceland to Anchorage, La.

Under way, Raceland to Plaquemine, La. L. E. Farley, Inc. 6-15-53.

Plaquemine to Anchorage, La.

22 miles, 18-in., contracted, Louisiana-Texas state line to near Shreveport, La. River Const. Corp. 6-53.

28 miles, 22-in., contracted, Shreveport, La., to Coushatta, La. River Const. Corp. 6-53.

Lakehead Pipe Line Co.—635 miles, 30-in., under way, Superior, Wis., to Sarnia, Ontario, Canada.

Contracted, Superior to Wisconsin-Michigan state line. Mahoney Contr.

Mackinac City along Straits of Mackinac to Red Oak, Mich. Bechtel Corp.

Red Oak via Bay City to International Boundary south of Port Huron on St. Clair River.

Water crossings of Mackinac, Saginaw, and St. Clair rivers. Merritt-Chapman & Scott Corp., W. J. Meagher & Sons, Inc., and Midwestern Constructors.

Under way, Michigan-Wisconsin State line through Crystal Falls to Cooks, Mich. Anderson Bros. 10-53.

Start 5-1, Cooks to St. Ignace, Mich., on Straits of Mackinac. Midwestern Constructors, Inc.

• **Magnolia Pipe Line Co.**—29 miles, 8-in., planned, Midland County, Texas area.

47 miles, 4-6-8-in., planned, Nolley field, Andrews County to Magutex field, West Texas.

• **Pasotex Pipe Line Co.**—146 miles, 10-in., planned, Snyder to Wink, Tex.

• **Phillips Pipe Line Co.**—45 miles, 12-in., planned, Rancho system to Sweeny, Tex. 6-53.

• **Platte Pipe Line Co.**—93 miles, 12-14-in., planned, Chatham station near Worland, Wyo., to Oregon basin, and Byron field. R. H. Fulton Co. Completion date 6-53.

Chatham, Wyo., to Oregon basin. R. H. Fulton Co.

Oregon basin to Byron-Garland field. R. H. Fulton Co.

• **Progress Pacific Pipeline Co.**—1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles Harbor, Calif.

• **Pure Transportation Co.**—45 miles, 8-in., planned, Kimball to Gurley, Neb.

• **Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., planned St. Helens to Norwich, Mich.

• **Service Pipe Line Co.**—185 miles, 16-in., planned, Bowie, Tex., to Drumright, Okla.

29 miles, 4-6-8-in., proposed, Natrona County, Wyoming.

70 miles, 12-in., proposed, Tioga to Williston, N. D.

100 miles, 16-in., planned, Tioga-Beaver Lodge area to Mandan, N. D. 12-53.

41 miles, 4-6-8-in., planned, Williams and Mountrail counties, North Dakota.

• **Texas-New Mexico Pipe Line Co.**—48 miles, 8-in., planned, from Lovington, N. M.

Texas Pipe Line Co.—34 miles, 6-in., under way, Sour Lake to Port Arthur, Tex. Houston Contracting.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned, Wink, Tex., to Norwalk, Calif.

Products Pipe Lines

H. W. Bass & Sons., Inc.—152 miles, 4-6-in., proposed, Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

• **Bell Oil & Gas Co.**—150 miles, 6-8-in., planned, Ardmore to Drumright, Okla. Completion date 6-1-53.

Buckeye Pipe Line Co.—370 miles, 10-14-16-in., under way, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y.

Under way, Macungie to Guthsville, Pa. Bills Const. Co. 4-20-53.

Under way, Guthsville to Allentown, Pa. Bills Const. Co. 4-20-53.

Contracted, Guthsville to Dupont, Pa. Pipe Line Const. & Drilling Co.

Contracted, Dupont north to Pennsylvania-New York state line. Fulghum Contr. Corp.

Contracted, Pennsylvania-New York state line to Auburn, N. Y. Williams-Austin.

Contracted, Auburn to Syracuse, N. Y. Williams-Austin.

Contracted, Auburn to Caledonia, N. Y. Universal Map and Survey Co.

• **Coastal Products Pipe Line Co.**—260 miles, 20-in., proposed, Houston to Baton Rouge.

• **Continental Pipe Line Co.**—(Yellowstone Line)—600 miles, 8-in., planned, Billings, Mont., to Spokane, Wash.

• **Harbor Products Systems**—86 miles, 16-in., planned, Woodbury Junction, Philadelphia to Trembley Point, N. J. (Joint ownership of Sinclair Pipe Line Co., Gulf Oil Corp., and Texas Co.)

Indiana Farm Bureau Cooperative Association, Inc.—180 miles, 8-in., under way, Mt. Vernon to Indianapolis, Ind. R. B. Potashnick, contractor.

70 miles, 4-in., under way, Indianapolis to Peru, Ind. R. B. Potashnick, contractor.

Inland Empire Pipe Line Co.—504 miles, 10-in., proposed, Billings, Mont., to Spokane, Wash.

• **Kaneb Pipe Line Co.**—236 miles, 8-in., planned, Wichita and Potwin, Kans., to Fairmont, Neb.

• **Phillips Petroleum Co.**—54 miles, 6-in., planned, Goldsmith to Borger, Tex.

52 miles, 10-in., planned, Shell's Brookshire system to Sweeny, Tex. 5-53.

• **Plantation Pipe Line Co.**—82 miles, 14-in., planned, Charlotte to Greensboro, N. C.

Salt Lake Pipe Line Co.—140 miles, 8-in., Pasco to Spokane, Wash. Completion date 6-53.

Standard Oil Co. (Ind.).—316 miles, 12-in., under way, Sugar Creek refinery to Dubuque, Iowa.

Under way, Polo, Mo., to Unionville, Mo. Sheehan Construction Co.

Planned, Mandan, N. D., to Moorhead, Minn.

• **Standard Oil Co. (Ind.).**—243 miles, 10-12-in., proposed, Whiting, Ind., to River Rouge, Mich.

Sun Pipe Line Co.—45 miles, 8-in., start 5-53, Toledo, Ohio to Inkster Junction west of Detroit. 10-53.

• **Texas Pipe Line Co.** (Evangeline Products Systems)—196 miles, 16-in., under way, Port Arthur, Tex., to Baton Rouge, La. Panama-Williams Co. Completion date 7-53.

Texas Pipe Line Co.—29 miles, under way, Fuller Ranch gasoline plant to Basin Pipe Line System, West Texas. Holder Const. Co.

• **United States Pipe Line Co.**—1,799 miles, 22-26-in., proposed, Beaumont, Tex., to Newark, N. J.

Beaumont, Tex., to Memphis, Tenn.

Memphis, Tenn., to Louisville, Ky.

Louisville, Ky., to Newark, N. J.

Laterals to Paducah and Lexington, Ky.

• **Williston Basin Pipe Line Co.**—244 miles, 8-in., proposed, Laurel-Billings, Mont., refineries to Glendive, Mont.

• **Wolverine Pipe Line System**—200 miles, 14-in., planned, Chicago to Toledo and Detroit. (Joint ownership of Shell, Texas, and Cities Service). Completion date 1-54.

Natural-Gas Pipe Lines

• **Allied Gas Co.**—24 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

• **Arkansas-Missouri Power Co.**—140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, Missouri.

• **Atlantic Seaboard Corp.**—29 miles, 26-in., proposed, looping along Cobb-Rockville line.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Chattahoochee Natural Gas Co.**—70 miles, proposed, Floyd County, Georgia, to Dalton, Ga.

• **Chicago District Pipe Line Co.**—35 miles, 24-30-in., proposed, Chicago area.

Cities Service Gas Co.—21 miles, 26-in., planned, Franklin and Anderson counties, Kansas.

15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

Colorado Interstate Gas Co.—250 miles, 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R. H. Fulton & Co., contractor.

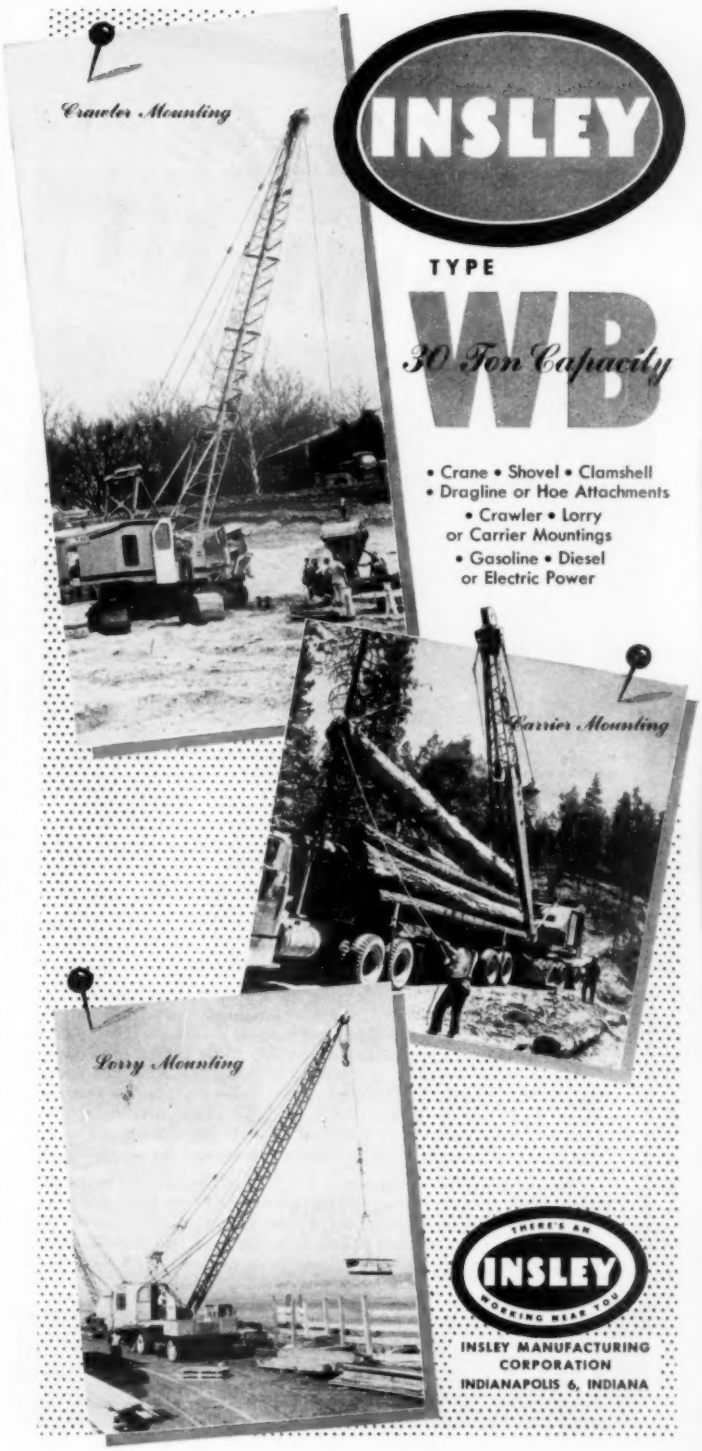
Pueblo County to Fowler, Colo.

• **Colorado Interstate Gas Co.**—365 miles, 22-in., proposed, Green River, Wyo., to Denver, Colo.

• **Cumberland and Allegheny Gas Co.**—31 miles, 12-in., proposed, Garrett County, Md., to Keyser, W. Va.

• **East Tennessee Natural Gas Co.**—158 miles, 16-in., planned, Knoxville to Kingsport, Tenn. (58 miles of laterals.) 11-53.

• **El Paso Natural Gas Co.**—1,778 miles,



Okadee
"THE PERFECT SEAL"
WRING FIT

No magic... No magnetism... lapped wring fit of every Okadee Valve disc and seat must pass this test of a perfect sealing surface. (unretouched photo)

...Here's What it Means to You in Terms of Valve Service

Flat mating surfaces within .000005", or less, of every set of Okadee valve discs and seats mean absolute shut-off of any material from ammonia gas to asphalt.

How long does this seal last in service? We honestly don't know. Tests under working conditions with propane were stopped after 269,000 operating cycles when no wear or seal failure could be detected. And Okadee valves do not have to be babied in service on corrosive or abrasive materials . . . Thousands of boilers have had Okadee blow-down valves in continuous, trouble-free service for fifteen years or more. If Okadee size-pressure-temperature ranges include your valve applications, Okadee installation will end your problems of valve performance once and for all.

Okadee valves are available in single-disc (one direction) and double-disc (two directions) types; screwed or flanged; ½" to 6" in standard A.S.A. dimensions; steel or semi-steel bodies (other materials to order); stainless steel or stellite seat facings; levers, rack-and-lever, worm-gear, hydraulic, pneumatic, automatic on-off control.

Write for Bulletin 332-C today!

OKd. Okadee COMPANY
332 South Michigan Avenue • Chicago 4, Illinois

proposed, Permian basin, New Mexico, Texas, and Colorado.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

• **Gulf Interstate Gas Co.**—860 miles, 30-in., proposed, Acadia Parish, La., to Boyd County, Ky.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—32 miles, 12-in., planned, Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hansock to Sanford, N. M.

46 miles, 12-in., under way, Tioga and Broome counties, New York. H. L. Gentry Const.

22 miles, 12-16-in., under way, Binghampton, N. Y.

• **Hope Natural Gas Co.**—33 miles, 8-10-12-in., planned, Wyoming County, West Virginia, south to Buchanan County, Virginia.

Houston Pipe Line Co.—40 miles, 16-in., under way, Edna to Tom O'Connor gas field. Houston Contracting Co. 4-53.

• **Interstate Power Co.**—26 miles, 8-in., proposed, from Nat. Gas P. L. Co. America line near Hooppole, Ill., to Clinton, Ia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., planned, Washington County to Cedar Rapids, Iowa.

• **Kansas-Nebraska Natural Gas Co., Inc.**—179 miles, planned, Kansas and Nebraska.

54 miles, 4-6-in., planned, Neligh to Hartington, Neb. Completion date 1953.

42 miles, 4-6-in., planned, Neligh to O'Neil, Neb. 9-53.

196 miles, planned, to serve Wisner, Pilger, and Stanton, Neb.

Kansas Nebraska Natural Gas Co.—70 miles, 6-8-in., under way, Nebraska City to Denver-Julesburg basin, Colo.

• **Lone Star Gas Co.**—100 miles, proposed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

• **Michigan Gas Storage Co.**—30 miles, 26-in., planned, Lainsburg Junction north. 7-53.

• **Midsouth Gas Co.**—191 miles, planned, Helena to Palestine, Ark.

• **Mississippi River Fuel Corp.**—109 miles, 10-18-in., planned, laterals in Woodlawn and Waskom gas fields, Texas.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

• **Montana Power Co.**—52 miles, 16-in., planned, Canada - Montana border to Cut Bank, Mont.

• **Morganfield Natural Gas Co.**—31 miles, 4-6-in., planned, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

• **Natural Gas Producers Inc.**—100 miles, 12-in., planned, Yenter pool to Denver, Colo.

• **Nevada Natural Gas Pipe Line Co.**—114 miles, 12¾-in., proposed, Topock, Ariz., to Las Vegas, Nev.

• **New River Gas Co.**—50 miles, planned,

Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **New York State Electric and Gas Co.**—59 miles, 8-10-24-in., proposed, Oneonta and Norwich to DeRuyter, N. Y.

New York State Natural Gas Corp.—104 miles, 14, 16, 20-in., under way, looping on Westmoreland, Armstrong, and Tioga counties, Pennsylvania. (Includes 17 miles, 16-in., in Potter County, Pennsylvania, and 21 miles 14-in., replacement in Line No. 507, New York.)

Colesburg Junction to Sabinsville, Pa. (begin at completion of Angelica job), Williams-Austin. Howard Bauer, superintendent.

21 miles, Columbiana and Stark counties, Ohio.

• **New York State Natural Gas Co.**—75 miles, 20-in., proposed, Cameron County to Armstrong County, Pennsylvania.

58 miles, 14 and 20-in., planned, New York State line.

Sabinsville to Boom station.

Skaneateles to Onondaga, N. Y.

Ithaca to Dryden, N. Y.

Niagara Mohawk Power Corp.—55 miles, 10-in., begin 4-1-53, Watertown to Syracuse, New York. Williams-Austin Co.

• **Northern Indiana Fuel & Light Co.**—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

• **Northern Natural Gas Co.**—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

210 miles, 26-in., planned, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

400 miles, 24-in., proposed, Emerson, Manitoba south to Red River Valley through Fergus Falls on to St. Paul, Minn.

102 miles, planned, extension.

Northern Natural Gas Co.—140 miles, 4-6-8-in., under way, south of Rolla, Kans., to Guymon, Okla. Reese Bros. Const. Co. E. H. Reese, spreadman at Hugoton, Kans.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

Oklahoma Natural Gas Co.—50 miles, 18-in., under way, Sapulpa to Chouteau, Okla. Engineering Const. Co. 6-53.

• **Pacific Gas & Electric Co.**—50 miles, 12-16-20-in., planned, Fresno to Merced, Calif.

(Section 1) 16-in., Burrel to near Easton, Calif.

(Section 2) 20-in., Holm to Topock-Milpitas line.

(Section 3) 12-in., parallel existing Madera-Livingston line, planned, Monterey to Fort Ord to Castroville; Napa Wye to Shellville; Cotati to Santa Rosa, Calif.

170 miles, 34-in., proposed, main-line loops along Topock, Ariz., to Milpitas, Calif.

Pacific Gas & Electric Co.—141 miles, 34-in., under way, parallel sections along Topock-

best pump for high bottom-hole temperatures

Very often when conventional all-metal pumps are run in deep wells, high bottom-hole temperatures create unequal coefficients of expansion between the plunger and barrel tube, causing the plunger to bind. This pump is particularly suited to this and other unusual well conditions such as float sand, gyp, etc., because the plunger fit is not critical. The loose-fitting plunger is efficiently sealed as fluid is displaced into an annular space between the barrel tube and an outer tube that reciprocates with the plunger. This "fluid seal" principle and a small bore in the plunger allow pumping at a greater strokes-per-minute rate, subject the rods to less stretch and strain, and appreciably reduce friction and wear of working parts. The valves are fitted with standard A.P.I. size balls and seats — no special sizes are required. A no-go ring on the standing valve seats off the seating area above the pump hold-down to prevent the pump from becoming sand-locked . . . an important feature for sandy wells. 12', 15', 18', and 25' pumps in 2"x1¼" and 2½"x1¾" sizes are available from leading stores throughout the oil country. Illustrated literature on request; write to P. O. Box 64, Fort Worth, Texas.

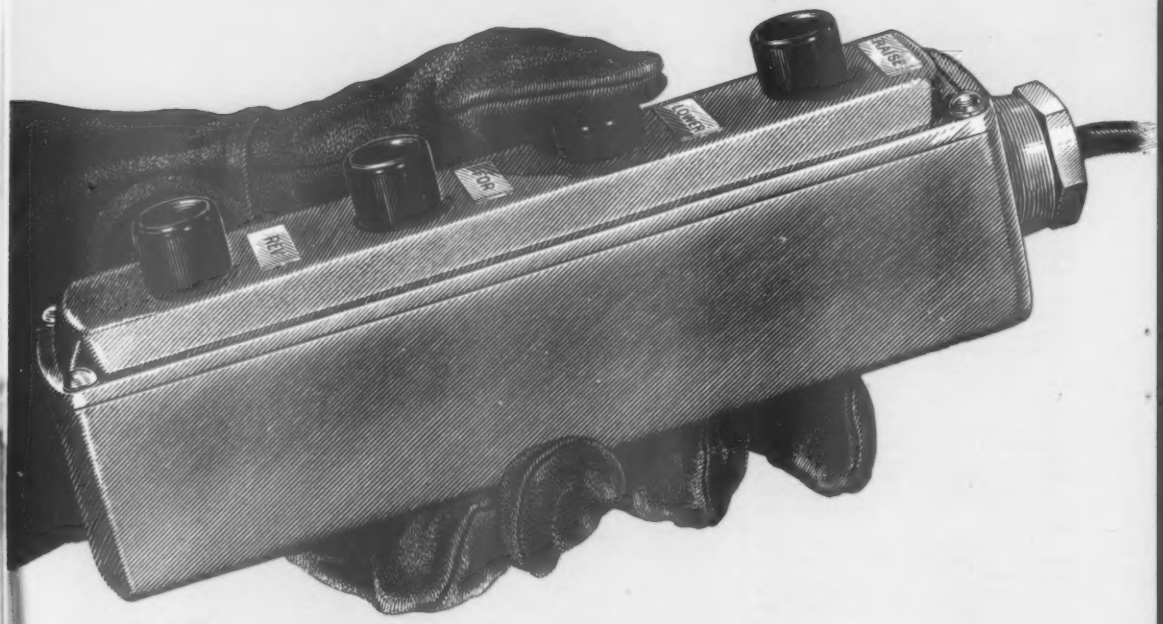
3 TUBE

ROD PUMP

HARBISON • FISCHER MFG. CO.

General offices and plant: FT. WORTH, TEX.

"Best Pumps in the Oil Patch"

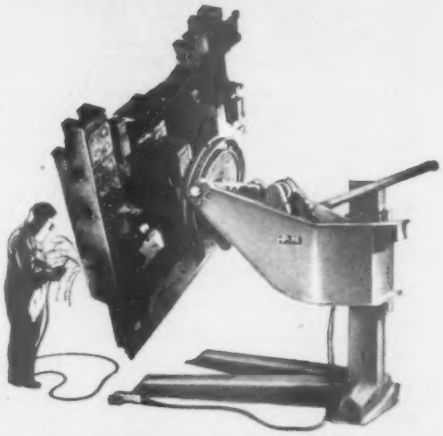


One finger is enough

to position heavy workpieces for fast, economical downhand welding

- with P&H positioners

Cut costs as much as 50% — position the weldment, not the operator! A touch of a control button does the work — saves handling time. Welding is downhand — permits using a larger rod for faster deposition. Welds are smooth, uniform. P&H Positioners are available in capacities from 2500 to 36,000 lbs. — remote-control and hand-operated models. Ask your P&H representative or distributor for further information — or write us.



P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4527 WEST NATIONAL AVENUE • MILWAUKEE 46, WISCONSIN

the P&H Line

P&H

Arc Welders and Electrodes

put welding in your plant on a low-cost, high-production basis

P&H DC RECTIFIER WELDER

Has Dial-lectric Control for instantaneous heat selection at the work. Three sizes, 200, 300, and 500 amps., NEMA rated.

P&H WELDING TWINS

P&H AC WELDER

Has P&H Dial-lectric Instantaneous Remote Control. Sizes up to 625 amps., NEMA rated. Connectable to 220 and 440 volts.

P&H WN-301 Engine-Driven DC ARC WELDER

Portable. Equipped with Dial-lectric Control. Runs at only 1750 rpm. Welding service range, 60-375 amps., NEMA rated.

P&H LOW-HYDROGEN ELECTRODES

13 types that take the problem out of welding high-sulfur, free-machining, low-alloy, and high-strength steels; castings, etc.

Ask your P&H representative or distributor for complete information, or write for free bulletins.

P&H WELDING DIVISION

HARNISCHFEGER CORPORATION

4527 W. National Ave., Milwaukee 46, Wis.

Milpitas line. Engineers Pipe Line, Ltd. Summer 1953.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

174 miles, 30 and 26-in., contracted. Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor.

26-in., Edgerton, Mich., Anderson Brothers

30-in., looping in Tuscola, Ill.

30-in., looping in Montezuma, Ind.

30-in., looping in Zionsville, Ind.

• **Panhandle Eastern Pipe Line Co.**—23 miles, planned, Peoria County, Illinois.

• **Peoples Natural Gas Co.**—25 miles 6 to 24-in., planned, Cambria and Blair counties, Pennsylvania.

• **Permian Basin Pipeline Co. (Northern Natural)**—163 miles, 16-30-in., proposed, Permian basin and eastern New Mexico.

• **Phillips Petroleum Co.**—125 miles, 2 to 24-in., planned, Midland, Upton, Glasscock, and Reagan counties, Texas. Completion date 6-53.

28 miles, 10-in., planned, Bayou Plant to Adams Terminal. Completion date 7-53.

• **Public Service Co. of Colorado**—95 miles, proposed, Douglas Creek and other gas fields to Grand Junction, Colo., area.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.

• **South Carolina Natural Gas Co.**—160 miles, 16-12-10-in., proposed, Aiken, S. C., to cities of Columbia, Summerville, and Charleston, S. C.

• **South Georgia Natural Gas Co.**—339 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee.

• **Southern California Gas Co.**—35 miles, planned, Antelope Valley, California.

Southern California Gas Co. and Southern Counties Gas Co. of California—45 miles, 30-in., contracted, looping on line from Arizona border to Los Angeles. J. B. Gill.

81 miles, 30-in., contracted, Whitewater to Desert Center, Calif. J. B. Gill.

Contracted, looping between Blythe and Colorado River and on westward of Indio. J. B. Gill.

• **Southern California Gas Co., and Southern Counties Gas Co.**—73 miles, 30-in., planned, loops on main line from Blythe to Los Angeles.

Southern Natural Gas Co.—1,235 miles, 24 to 4½-in., contracted, Louisiana, Mississippi, Alabama, and Georgia, and South Carolina. Houston Contracting and H. C. Price. Fall 1953.

Gwinville, Miss., to Franklinton Junction, La.

Lateral from Franklinton Junction, La., to Sand Hook field, Mississippi.

Franklinton Junction, La., to Duck Lake gas field, Louisiana.

Duck Lake gas field, Louisiana, to Lake Sand field, Louisiana.

• **Southern Union Gas Co.**—21 miles, 20-in., planned, Albuquerque, N. M.

30 miles, 12-20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.& E. line to Victorville, Calif.

Tennessee Gas Transmission Co.—574 miles, 30-in., under way, Kinder, La., northeast

there is no safer, longer lasting chain than CAMPBELL CHAIN

- Spinning Chains
- Boomer Chains
- Winch Line Chains
- Proof Coil Chain
- BBB Coil Chain
- High Test Steel Chain
- Cam-Alloy Steel Chain

Get it from your supply store, and specify CAMPBELL

CAMPBELL CHAIN *Company*
York, Pa. and West Burlington, Iowa

Factory Warehouses:
Houston, Texas
Sacramento, Calif.

CAMPBELL CHAIN

Makers of Famous *Lug-Reinforced* **TIRE CHAINS**

"SERV-RITE"

Insulated Thermocouple Wire Extension Lead Wire

FOR

PLATINUM COUPLES
CHROMEL ALUMEL
IRON CONSTANTAN
COPPER CONSTANTAN
IRON CUPRONEL

No matter what your wire or insulation requirements may be, you can depend on Gordon "Serv-Rite" insulated wire for pyrometers—recognized as a standard of highest quality for nearly half a century. All "Serv-Rite" wire is now manufactured in the new, completely modern Gordon plant, employing up-to-date equipment and machinery, supervised and operated by skilled technicians—your guarantee of continued precision quality. In addition to maintaining large stocks of all common types of wire, Gordon will manufacture special insulation, in long or short runs, to suit your individual needs and meet your most rigid specifications.

All Types of Insulation

Felted Asbestos
Asbestos Braid
Weatherproof Braid
Glass Braid
Polyvinyl Plastic
Nylon Braid
Stainless Steel Armored Braid
Silicone Treated
Cotton Braid
Lead Jacket

The home of "SERV-RITE"

Full Particulars on Request

GORDON SERVICE

CLAUD S. GORDON CO.

Manufacturers & Distributors

Thermocouple Supplies • Industrial Furnaces & Ovens
Pyrometers & Controls • Metallurgical Testing Machines

Dept. 29 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 29 • 2035 Hamilton Ave., Cleveland 14, Ohio

through Louisiana, Mississippi, to Portland, Tenn., Texas, Ohio, and Pennsylvania.

Under way, Natchitoches to near Goldonna, La. Oklahoma Contr. Co. 8-53.

Under way, Bolivar to Selmer, Tenn. Oklahoma Contr. Co. 8-53.

Under way, Springfield, Tenn., to near Bowling Green, Ky. Anderson Bros. 8-53.

Under way, Campbellsville to near Danville, Ky. Western Pipe Line Constructors, Inc. 8-53.

Under way, Carter, Ky., to Ohio River. Western Pipe Line Constructors, Inc. 8-53.

Under way, Mercer, Pa., to Coudersport, Pa. H. C. Price. 8-53.

Under way, Coudersport to Hebron field, Potter County, Pa. Bechtel Corp. 8-53.

• **Tennessee Gas Transmission Corp.**—45 miles, 20-in., loops, Buffalo to U. S.-Canadian border near St. Catharines.

50 miles, 30-in., under way, Sinton and El Campo, Tex. Houston Contracting Co. 4-53.

Texas Eastern Transmission Corp.—315 miles, 24-in., under way, Provident City, Tex., to Castor, La. Brown & Root, Inc.

Constructed, Lavaca County to Waller County, Texas. Associated Pipe Line Contractors, Inc.

Contracted, Polk County to Shelby County, Texas. Williams Brothers Co.

Contracted, River crossings of Trinity, Brazos, Colorado, and Saline rivers, Pentzien, Inc.

80 miles, under way, Warren to Livingston, Tex. Anderson Bros. 5-20-53.

• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 6-30-53.

• **Trans-Northwest Gas, Inc.**—246 miles, proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

• **Union Oil Co. of California**—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles Basin.

• **United Fuel Gas Co.**—50 miles, 20-24-in., proposed, Wood County to Lanham, W. Va.

32 miles, 24-in., proposed, near Ripley, W. Va., to Lanham station, Putnam County, W. Va.

• **United Gas Pipe Line Co.**—44 miles, 20-in., planned, Lirette field to Harvey, La.

31 miles, proposed, offshore Gulf of Mexico to Terrebonne Parish, Louisiana.

• **United Natural Gas Co.**—50 miles, 12-in., planned, Elk County to Jefferson County, Pennsylvania.

• **Utah Natural Gas Co.**—103 miles, 16-18-in., proposed, Clear Creek field near Price to Salt Lake City, Utah.

18-in., Clear Creek to Provo, Utah.

16-in., Provo to Salt Lake City, Utah.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Warren Petroleum Corp.—78 miles, 2-24-in., proposed, Lovington, N. M. Completion date 9-53.

Westcoast Transmission Co., Ltd.—(See foreign natural gas pipe lines).

• **Western Slope Gas Co.**—39 miles, 8-in., planned, Garmesa to West Douglas Creek, Colo. Foutz & Bursum Const. Co. 10-53.

Wilcox Trend Pipe Line Co. (Harry Bass Drlg. Co.)—157 miles, 14-16-20-in., under way, gathering system for delivery to proposed Texas Eastern terminal at Provident City, Tex. H. B. Zachry. Completion date 5-53.

Under way, Lavaca County to DeWitt County, Texas, and Duval County to DeWitt County, Texas. H. B. Zachry. 5-53.

Under way, laterals and gathering lines. Altgelt Const. Co.

Foreign Crude-Oil Pipe Lines

Arabian American Oil Co.—16 miles, 12-

DITCH WITCH World's Best SMALL TRENCHER

FAST! STURDY

4 DITCH-WITCH Models Digs 2" to 6" Trenches
Any Depth to 36"

A self-contained ditcher operating under its own power—digs clean even 2" to 6" trenches to a 36" depth. Light weight, mobile, low operating and maintenance costs.

DITCH-WITCH used in these Industries: Construction, Maintenance, Petroleum, Railroad, Electrical, Plumbing, Municipal

PROVED IN ALL SOILS

DITCH-WITCH digs as many feet of trench as machines four times its size. Pays for itself in a few days.

Write Today for Illustrated Literature

DITCH WITCH THE CHARLES MACHINE WORKS
621 B Street
PERRY, OKLAHOMA

• Experience pays off in construction efficiency, good work and on-time completion.

HOUSTON CONTRACTING CO. LTD.
General Contractors
OIL • GAS • GASOLINE • WATER PIPE LINES
2707 FERNDALE • HOUSTON 6, TEXAS
GENERAL PARTNERS
LAURENCE H. FAVROT • R. P. GREGORY
ASSOCIATE
GEORGE A. PETERKIN

in., under way, loops on Al Kobar, Saudi Arabia to Bahrein Island, submarine lines.

Basrah Petroleum Co.—72 miles, 24-in., under way, Zubair to Fao. Completion date May 1953.

• **Cia. de Petroleo Ganso Azul, Ltd.**—48 miles, 4-in., planned, Ganzo Azul field to Pucalpa on upper Ucayali River, Peru.

• **Creole Petroleum Corp.**—25 miles, 34-in., planned, Lagunillas to La Salina (State of Zulia). Completion date April 1953.

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Interprovincial Pipe Line Co.—135 miles, 24-in., looping from Regina to U. S. border, Canada.

• **National Iranian Oil Co.**—38 miles, 12-in., planned, Lali to Masjid-i-Sulaiman, Iran.

27 miles, 12-in., planned, Kut-Abdullah to Zergan, Iran.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

• **Saskatoon Pipe Line, Ltd.**—56 miles, 6-in., planned, Milden to Saskatoon, Sask.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pta. Nino to La Dorada.

• **Trans Mountain Oil Pipe Line Co.**—30 miles, planned, Vancouver, B. C., terminal to Ferndale, Wash.

Trans Mountain Oil Pipeline Co.—711 miles, 24-in., under way, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers. Completion date 8-53.

Edmonton to Acheson, Canadian Pipe Line Const. 8-53.

Acheson to Blue River, B. C., Comstock Midwestern. 8-53.

Blue River, B. C., to Coquehalla, B. C., Mannix, Ltd. 8-53.

Coquehalla to Vancouver, B. C., Comstock Midwestern. 8-53.

• **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipe Lines

Colombian Ministry of Petroleum. — 115 miles, 4-in., begin 1953, La Dorada to Cartago, Colombia, Williams Bros. Engineers.

93 miles, 8-in., begin 1953, Cantimplora to Dorada, Colombia, William Bros. Constructors.

• **Empresa Nacional del Petroleo** — 80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

Empresa de Ferrocarriles Ecuatorianos.—50 miles, 6-in., contracted, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C.R.C. Engineering Co., engineers.

• **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

• **Shell Co. of Australia.**—58 miles, 8-in., planned, Geelong, Melbourne to Newport, Australia.

• **Sun Pipe Line Co. of Canada.**—200 miles, 8-in., planned, Sarnia, Hamilton, Toronto, Ont.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

Foreign Natural-Gas Pipe Lines

• **Azienda Generale Italiana Petroli.**—110 miles, 12-14-16-in., Start 11-52. Cortemaggiore to Genoa. Completion date 11-53.

Azienda Generale Italiana Petroli — 90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

Direccion General del Gas del Estado—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo**—80 miles, 10¾-in., planned, Concon to Santiago, Chile.

• **Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos.—205 miles, 16-in., under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

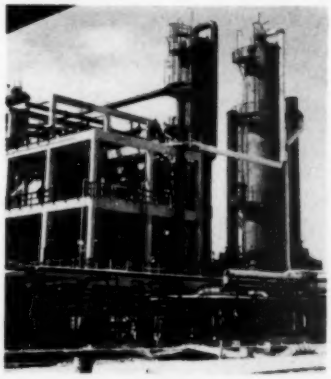
• **Trans-Canada Pipe Lines, Ltd. (Canadian Delhi Oil Co.)**—2,247 miles, 14 to 30-in., proposed, Alberta to Toronto to Montreal.

747 miles, 8 to 24-in., gathering system in Alberta.

• **Westcoast Transmission Co., Ltd.**—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis, engineers.

For Every Steam Hose Requirement...



Make Your Safe Choice **"INFERNO"**

"INFERNO" Steam Hose, Style D-84, is a Goodall *"Standard of Quality"* product, outstanding in strength, safety and long-service economy. The *right* hose for every refinery steam service, including fire smothering.

Tube has remarkable resistance to hardening and cracking under high temperatures. Tightly braided galvanized steel wires reinforce the strong, heat-resistant carcass. The tough red cover withstands severest abrasive wear and all conditions of weather.

Style D-162. Same general construction as above, but with Static Wire and Neoprene Cover.

"INFERNO" is built for pressures to 200 lbs. and temperatures to 400°F. Sizes ½" to 2", in maximum lengths of 50 feet. *Contact our nearest branch for details and prices.*

Est. 1870

GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia · New York · Boston · Pittsburgh · Chicago · Detroit · St. Paul · Los Angeles San Francisco · Seattle · Portland · Salt Lake City · Denver · Houston · Distributors in Other Principal Cities

Goodall Rubber Company of Canada, Ltd., Toronto.

always a great performance

WHEN YOU NEED IT!

with REX SPEED-PRIMER PUMPS*

Whether salvaging oil from a slush pit . . . removing water from the fire wall embankment around oil storage tanks . . . transferring oil direct from pipe line to tank truck . . . dewatering around a drilling location . . . general utility use about pipe lines and refineries . . . the Rex Speed-Primer Self-priming Centrifugal Pump outperforms all others in petroleum industry and oil field operations. Rex Speed-Primers are proved by field use. Maximum capacities with mud and debris-filled water . . . instant starting in cold and wet weather . . . ease of inspection and maintenance against time limits.

Just check these outstanding features:

- **Simplest Pump Ever Designed**
- **Most Accessible**
- **Highly Portable**
- **Simplest, most positive leakproof seal ever designed**
- **The only pump with the Patented Adjustable Air Peeler which maintains *New Pump Efficiency for the lifetime of the pump.***

Visit Our Booth in the Texas Building at the Oil Show

For all the details write for Oil Field Pump Bulletin No. 51-37
Chain Belt Company, 4619 W. Greenfield Ave., Milwaukee 1, Wis.

**The original "little yellow Pump"*

CHAIN BELT REX COMPANY

Chain Belt COMPANY OF MILWAUKEE

OIL FIELD SALES OFFICES

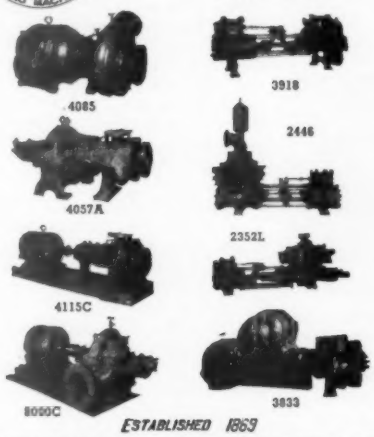
New York • Tulsa • Dallas • Houston • Midland • Los Angeles

"Sold in leading supply stores throughout the oil country."

PUMPS

CENTRIFUGAL
RECIPROCATING

BUILDERS OF OUTSTANDING PUMPS
Since 1869



ESTABLISHED 1869

DEAN BROTHERS PUMPS INC.

INDIANAPOLIS IND.

323 W. TENTH ST.

al Roliguide installation. Note length of
nging arms which provide proper stabili-
zation. Inset, right, Replacement Roller.

GUIDES

ine wear

rig

aves in
ile-up
w, rig
s.

Really Free Turning
BALL BEARING SWIVEL FITTINGS

RAMSCO

FOR LIQUID GASES, STEAM, AND CHEMICALS. HOT OR COLD SERVICE. CONTINUOUS OR OCCASIONAL ROTATION.

360° FREE ROTATION—1, 2 AND 3 PLANES FITTINGS AND PRESSURES TO 15,000 P.S.I. AND TEMPERATURES TO 750° F.

Over 500 sizes, types, styles. Low pressure fittings ⅜" to 14". High pressure and high temperature ⅜" to 6". Universal service (U. S. type) fittings and pressures to 1,000 psi. Temperatures to 750° F. asbestos packed. When packed with Teflon ideal for corrosive service. Gear driven types for loading racks also available.

Send for complete catalog and prices. State kind of service, pressure, temperature, pipe sizes and indicate style at right, threaded, flanged or weld ends.

RAMSCO

RASMUSSEN MFG. CO.
12305 INDUSTRIAL AVENUE
HOLLYDALE, CALIFORNIA

AN OLDTIME RECIPE FOR LONG-LIVED PIPE LINES

A recipe that waterworks and gas distribution engineers have used for over a century is: *specify cast iron pipe.* Refinery engineers have used it, too—with good success—for run-down, water and gasoline lines—for fire protection systems—salt water disposal—condenser and cooling coils.

No other pipe, at reasonable first cost, offers comparable resistance to both interior and exterior corrosion. No other pipe, in its price range, is as economical in the end. Available with bell-and-spigot, plain end and flanged, or with standardized mechanical joints. Cast Iron Pipe Research Association, Thomas F. Wolfe, Engineer, 1015 Peoples Gas Bldg., Chicago 3, Illinois.

CAST IRON PIPE
FOR LONG LIFE AND ECONOMY

Among the Drilling Contractors

Geary Joins Staff of Abilene Drilling Firm

D. H. GEARY

David H. Geary, for the past 3 years machinery sales representative for Bethlehem Supply Co. in the North Central Texas district and Illinois, is now associated with Henson Drilling Co., headquartering at Abilene, Tex. Henson Drilling Co., which moved its headquarters from Illinois to Abilene in May 1951, operates five rotary rigs in West Central and West Texas. The company is headed by O. L. Henson.

Delta Completes Large Pennsylvania Gas Well

Delta Drilling Co., Tyler, Tex., which pioneered the use of rotary tools in the development of gas production in the Elk County, Pennsylvania, area, currently is operating three rigs in that area, one for the account of itself and associates, and two on contract for New York State Natural Gas Co. Its first rotary rig was moved into the area a year and a half ago.

The company reports the late completion of the largest well brought in in Pennsylvania in more than a year. The well, 1 Sagamore Hunting Club, located in Benezette Township, and drilled for itself and associates (George C. McGee and Roland Beers), gaged 18,500,000 cu. ft. of gas per day with rock pressure of 3,500 psi. It produces from the Oriskany sand at a total depth of 6,892 ft.

Rutherford Drilling Co., Houston, is starting another test for Falcon Seaboard Drilling Co. and associates on the northwest flank of the Raccoon Bend field, Austin County, Texas Gulf Coast. Rig came from a dry hole just completed for the same operators in the immediate area. The new operation is 3 Hardy, in the William Smeathers Survey. Dry hole was 1 Remmert, quit at 6,653 ft.

Mac Drilling Co., Houston, has a new contract with Magnolia Petroleum Co. for a 10,000-ft. test, 1-C Powell, to be drilled about ¾ mile north of production in the Iowa field, on the Jefferson Davis-Calcasieu parish line, coastal Louisiana. Location is in Jefferson Davis Parish.

Nuckolls-Bell Drilling Co., Oklahoma City, has another well drilling for Macmillan Petroleum Corp. and associates in the new Southwest Navina field, in southern Logan County, Oklahoma. The latest operation, third for

Double crew at location Production Maintenance Drilling Co., Inc., Houston, is drilling for Humble Oil & Refining Co. in the Amelia field, near Beaumont, in Jefferson County, Texas Gulf Coast. Front row, left to right: D. R. Everitt, tool pusher; M. H. Jacobs, day-tour driller; E. B. Brown and C. L. McAdams, crewmen; L. H. DePriest, evening-tour driller. Rear, left to right: J. C. Womack, James Watts, Jack Harris, V. C. Bearden, and Claude Thompson, crewmen.

INFERNO
"Tailor-Made"
Gauges
Have Many
Advantages
• Extra Thick Gauge Glass (1")
• Specially designed clamps to minimize glass breakage due to uneven tightening of the clamp bolts.
• Available in Navy Bronze, Steel or Stainless Steel.
• Machined in 1 piece from solid bar stock.
Write for Bulletin No. 23-A
THE INFERNO CO.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.
INFERNO

Here's a formula for Safety

$$S = PB \int \left[\frac{1}{1^n} + \left(\text{[illegible]} \right)^n + \text{[illegible]} + \text{[illegible]} \right] ds$$

$S \rightarrow min.$

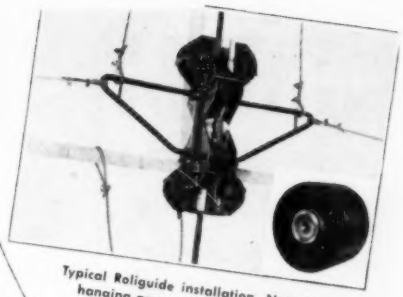
Where S is the Safety you want on your rig, PB is your constant assurance of quality oil field products.

1 is the rigs throughout the world already protected by PB.

is a PB Wire Line Guide, and

are the draw works and crown blocks on these rigs that take the beating from whipping line.

is a rubber roller that contacts the line and dissipates the dangerous shock and vibration.



Typical Roliguide installation. Note length of hanging arms which provide proper stabilization. Inset, right, Replacement Roller.

* PB WIRE LINE GUIDES

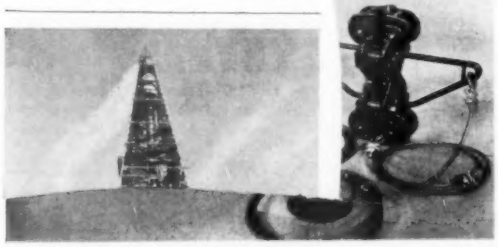
...prevent wire line wear
...protect your rig

PB Wire Line Guides absorb the dangerous whip, lash and traveling waves in the drilling line . . . prevent excessive wire line wear, uneven spooling and pile-up on the drum . . . and protect the fast sheave of the crown block. Your crew, rig and derrick work easier, operations and can be safer when protected by PB Wire Line Guides.

produced only by additional processing, usually from caustic solutions that have been used in washing straightrun distillate fuel oils, Warren explained.

Expensive . . . "Because the process is an expensive one, especially when used on low-naphthenic crudes, and because

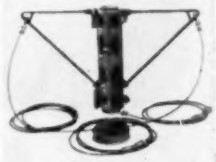
Both PB Standard and Roller Type Guides utilize the same dampening principle to stop wire line vibration. Rubber stabilizing elements or rollers absorb the vibration which is then dissipated through the rugged guide body to the hanging assembly. You're assured a straight, steady length of wire *through which waves cannot travel.*



ROLIGUIDE, left, is a heavy-duty roller type guide for deep wells. Handles lines to 1⅛" in diameter at high line speeds. ROLLETTE, right, for all average depth drilling, features the same design and construction as the larger ROLIGUIDE. Replacement rollers of solid, long-wearing rubber, with integrally molded roller bearings and housing are available on order.

SOLO is a smaller guide which contains one rubber stabilizing element. SOLO is specially designed for small rigs and shallow well drilling. Sold only as shown above, without hanging lines.

DUET is adaptable to small derricks and portable mast installations where the weight and stabilizing effect of a larger guide are not required. It contains two rubber elements. Shipped ready to install.



QUARTET is a Standard Guide containing four rubber stabilizing elements. It has sufficient weight to minimize wire line whip and vibration on all but the largest derricks. Delivered with hanging lines.

Use of wire line guides is recommended by both spooling drum and wire rope manufacturers . . .

Available at your nearest supply store or through BJ-PB Representative.

Your Protection is our Business

PB DIVISION

Byron Jackson Co.

Since 1872

LOS ANGELES NEW YORK FORT WORTH HOUSTON

BJ PB

For L-O-N-G-E-R
THREAD LIFE

Use these famous Jimmie Gray Tool Joint and Drill Collar Compounds

You'll like this new Jimmie Gray Dope Brush, too!

YES SIR—sold through your favorite supply store

PETROLEUM DISTRIBUTING COMPANY
BOX 203 - HOUSTON, TEXAS - CHarter 5648
Quality Oil Field Lubricating Oils and Greases

the operators in the field, is 1 Berg, located in the SW SW NW 14-15n-4e. Objective is the Wilcox sand, productive in the discovery well, 1 Krout, and now being tested in the second well, 2 Krout.

Circle Drilling Co., Lake Charles, La., has a new contract operation under way for Lloyd H. Smith, Inc., of Houston, in the North Elton field, Allen Parish, Louisiana Gulf Coast. Location is for 2 Rees, in 23-6s-3w, on the north side of the field.

Meredith, Clegg & Hunt, Houston, will drill a deep test for Texas Crude Oil Co. at a semiwildcat location south of production of the South Bayou Mallet field, in Acadia Parish, South Louisiana. The test, 1 Casselman, in 33-8s-1e, is projected to 11,000 ft.

Big Chief Drilling Co., Oklahoma City, has contracted with Seaboard Oil Co. for a deep test to be drilled in Carter County, southern Oklahoma. Location is for 3 Smith, in the SE NE SW 19-3s-1e. Hole is projected to 12,500 ft. The two previous tests on the lease were dry at depths of 5,043 ft. and 3,722 ft., respectively.

Kidd Williams Drilling Co., Tulsa, has a well-deepening job under way for The Texas Co. in Carter County, southern Oklahoma. It is at 1 Dillard, SE SE SW NW 11-4s-2w, a wildcat previously carried as dry at 7,635 ft. Hole is to be depened to around 12,000 ft.

Claude Roberson has a new operation under way for Stephens & Phillips of Dallas on the west edge of the Springhill field, in northern Webster Parish, northwestern Louisiana. It is 2 Grafton, west offset to the operators' first test, 1 Grafton, recently chalked up as a failure in the Hill sand at 5,120 ft. The new test is propected to the Pettit around 6,000 ft.

ACTIVE ROTARY RIGS*
(United States and Western Canada)

Area—	Week ended 4-13-53	Change week ended 4-6-53	Change week ended 4-14-52
Gulf Coast	595	+ 8	— 22
N. & W. Tex.-N. M.	820	+15	—232
Ark.-N. La.-E. Tex.	126	— 5	— 21
Oklahoma	324	—13	— 22
Kansas-S. Nebraska	187	+ 9	+ 13
Illinois-Eastern	103	+ 3	— 6
Rocky Mountains	207	+ 7	+ 20
Pacific Coast	168	+ 2	+ 8
Total U. S.	2,530	+26	—262
Western Canada	146	— 6	+ 6
Total	2,676	+20	—256

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Rocky Mountains and western Canada areas are shown on pages 225 and 226.

Lift, Push or Pull AT ANY ANGLE with a SIMPLEX LEVER JACK

MODEL 310-A EMERGENCY JACK
with four-way lift power

1. On the rotating cap.
2. On the auxiliary cap shoe (two positions).
3. On the machine corrugated toe.
4. At any intermediate point, using chain as sling.

LIFTS 15 TONS A FULL 14 INCHES

Model A-1022 Ratchet Lowering Jack has aluminum housing which reduces weight to 42 lbs. Capacity 10 tons.

WRITE FOR COMPLETE INFORMATION
Simplex LEVER - SCREW - HYDRAULIC Jacks
TEMPLETON, KENLY & CO.
1034 S. CENTRAL AVE., CHICAGO 44, ILL.
A. C. Templeton, 5627 Del Roy Drive, Dallas, Tex.

NOW IN STOCK!
STURDY STEEL LOCKERS

IN MANY SERVICEABLE MODELS
All-purpose lockers for home office or field use, now available from stock.
Order today
ADJUSTABLE STEEL SHELVING IN STOCK
— Ready to Assemble!
SCOTT-RICE COMPANY
610 S. Main Tulsa 2, Okla.

REFINING

Napthenic Acid . . .

. . . production could be doubled, Warren predicts

WASHINGTON.—Given the necessary financial incentive, domestic refiners could practically double their output of high-grade naphthenic acid in the event of war, it was disclosed by Deputy Petroleum Administrator J. Ed Warren.

The acid, used commercially in paints, cuttting oils, and lubricants, textile impregnants, and emulsifying agents, has important military uses in the manufacture of napalm fire bombs and copper naphthenate for mildew-proofing.

A survey of output and potential capacity for naphthenic acid of 180 acid number or higher, covering about 72 per cent of the total refinery capacity of the country, indicated that current production runs about 33,600,000 lb. a year but in the event of emergency an additional 32,500,000 lb. could be developed.

Naphthenic acid is not recovered in normal refinery opeartions and can be produced only by additional processing, usually from caustic solutions that have been used in washing straightrun distillate fuel oils, Warren explained.

Expensive . . . "Because the process is an expensive one, especially when used on low-naphthenic crudes, and because the outlet for production is largely dependent on military needs, few refiners are anxious to get into this production," Warren said. "Undoubtedly if the need for sharply expanded output should arise, some special incentive would have to be provided to insure needed supplies."

Naphthenic acid was put under allocation control by the National Production Authority in April 1951. Military demands, however, did not increase as much as had been expected and a new source of acid was found in imports by one oil company, and the controls were lifted a year ago.

Military experts recognized that in case hostilities are stepped up demand for the acid will rise shortly and the PAD survey was undertaken to determine the ability of the industry to meet such a demand.

Electrolytic Caustic Regenerator Contracted

ALMA, Mich.—Leonard Refineries, Inc., of Alma has contracted with American Development Corp., New York, for a license to employ the electrolytic process for regeneration of spent alkaline solutions at the company's 9,000 bbl. per day Alma refinery.

The new plant will be used to regenerate the caustic soda employed in treating catalytic cracked gasoline and other products at Alma.

Fluor Gets Catalytic Cracking Unit Contract

SAN FRANCISCO.—Standard Oil Co. of California has awarded Fluor Corp., Los Angeles, the contract for construction of a 40,000 bbl. per day catalytic cracking plant at its El Segundo refinery. The plant will be the largest of its kind in the world.

The Los Angeles firm also was awarded contracts for an addition to the alkylation plant, alterations to the naphtha rerun stills, and for construction of a para xylene plant at the refinery.

M. W. Kellogg Co., New York, was given contract for construction of a 52,000-bbl. daily residium stripper for the cat-cracking project. Contract for installation of off-site facilities required for the cat cracking project and para xylene plant was given to Macco Corp., Paramount, Calif. All work is scheduled for completion by August 31, 1954.

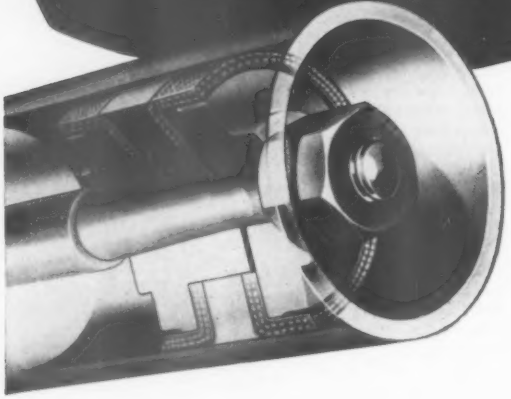
On Stream

This unusual view is of the new derrick-type Thermofor catalytic cracking unit which recently went on stream at Vickers Petroleum Co.'s Potwin, Kans., refinery. It has a nominal fresh-feed capacity of 4,000 bbl. per stream day plus 2,500 bbl. per day of recycle, operating at 75 per cent conversion level.

McCORD
Mechanical
LUBRICATORS
FOR SLUSH PUMP and DRILLING ENGINES
TYPE "SP"
Built to take it—to stand up under the extreme conditions of oil field service. You can depend on McCord "SP" lubricators to deliver oil in measured quantities without interruption. Specify McCord "SP".
For Sale by National Supply Company
Standard of the Oil Fields
McCORD CORPORATION
DETROIT 11, MICHIGAN

Now!
STEAM and MECHANICAL
ATOMIZATION
COMBINED . . .
NATIONAL AIROIL
DUAL STAGE
OIL BURNER
Now, at last, the inherent advantages of both systems of fuel oil atomization are *profitably* yours . . . within the one, new NATIONAL AIROIL Dual Stage Burner.
41 years of combustion equipment design and manufacture are in back of the Dual Stage Oil Burner . . . and, it has been thoroughly tested and proved in the field for firing: Petroleum Processing Heaters; Rotary Kilns; H. R. T., Scotch Marine and Water Tube Boilers; etc.
Available in three sizes, the NATIONAL AIROIL Dual Stage Burner fires all grades of fuel oil from No. 2 to No. 6, with a ready capacity of 80 to 300 g.p.h. Further, for a perfect flame pattern, we would recommend using with the Dual Stage Burner either the NATIONAL AIROIL Universal Register for forced draft or, the NATIONAL AIROIL Tandem Units for natural or induced draft furnaces.
Get detailed description, illustration, and specifications in NATIONAL AIROIL Bulletin 25.
National Airoil Burner Co.
1236 E. Sedgley Ave., Philadelphia 34, Pa.
S.W. Division: 2512 So. Blvd., Houston 6, Texas
INDUSTRIAL OIL BURNERS, GAS BURNERS, FURNACE EQUIPMENT

YOU GET higher efficiency WITH DARCOVA PUMCUPS ON THE JOB!



THERE are two basic, well-proved reasons why more and more Darcova Pumcups are going into cylinders of air and hydraulic controls and mechanisms.

First, texture-engineered Pumcups outlast most other piston packings at least 3 to 1. There's less replacement, less down-time!

Secondly, efficiency *does not diminish* as Pumcups wear. Response is always faster, surer, with less power consumed!

Darcova Pumcups are available in sizes and engineered textures ideal for virtually any service. Why not find out what they can save *you?*

ASK FOR BULLETIN No. 4502

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

DARCOVA — THE ORIGINAL COMPOSITION CUP — **PUMCUPS**

LUBRICATE PLUG VALVES 10 to 15 times FASTER

One Company saved over $10,000.00 in one year!

Reduces plug valve maintenance costs ½.

Using the low-cost DELTA-DESCO SYSTEM one operator can lubricate 10 to 15 valves in the time usually required to lubricate one with the conventional jack screw. Think of the man-hours saved.

DELTA-DESCO Plug Valve Lubrication SYSTEM

Includes DELTA Adapter Fittings, High Pressure Gun, DESCO Specialized Lubricants, and Engineering Service. Write for facts and figures.

ANOTHER VALVE SAVER —

DELTA AUTOMATIC Plug Valve LUBRICATOR

A simple device, lubricates valve each time it is opened and closed. Ideal for loading platform, manifold, LPG and other frequently used valves. Ask for catalog.

The Only Complete Plug Valve Lubrication Company

DELTA-DESCO SYSTEM

DELTA ENGINEERING SALES CO.

806 Louisiana Ave. • Phone 5-2416

SHREVEPORT, LOUISIANA, U.S.A.

Sales Offices In All Principal Cities

California Refiners Raise Gasoline Yields

LOS ANGELES.—Union Oil Co. estimates that this year, following completion of a $24,000,000 modernization and enlargement program at its Los Angeles refinery, the plant's gasoline production will be approximately 64,000 bbl. daily.

This recovery will represent a yield of about 40 per cent from the raw materials charged. It will compare with a 36.4 per cent yield, and 54,000 bbl. daily, which was being obtained last year before some of the new units were placed on stream.

Similar higher gasoline recoveries were reported by Richfield Oil Corp. due to completion of improvements at its Watson plant in mid-1952.

Prior to the work 55.6 per cent gasoline and middle distillates and 41.4 per cent residual fuel were being obtained. Since completion of the $3,880,000 expenditure the yields have been 64.0 and 31.9 per cent, respectively.

Ethyl Corp. Expands Its Farm-Chemicals Activity

HOUSTON.—Ethyl Corp. has announced a further expansion of its agricultural-chemical activities with the revelation that it is now producing, in commercial quantities, the herbicide 2, 4, 5-trichlorophenoxyacetic acid.

The compound, referred to as 2, 4, 5-T, is a highly effective chemical weapon against mesquite, poison ivy, and many other unwanted woody plants.

In addition to 2, 4, 5-T, Ethyl is a leading producer of benzene hexachloride, BHC, which has been widely used against the boll weevil and other cotton pests.

The 2, 4, 5-T is being produced as the acid and as the butoxyethoxypropanol ester for preparation of low-volatile ester formulations. Ethyl will market its production to agricultural-chemical compounders who formulate the finished herbicide for resale to the consumer.

Refining Brief

HOUSTON.—The Houston chapter of Thermal Insulation Society has been organized with the following officers elected for the coming year: President, L. A. Endicott, Carbide & Carbon Chemicals Co., Texas City; vice president, D. R. Armstrong, Aber Co., Houston; and secretary-treasurer, John F. Conlon, Carbide & Carbon Chemicals Co., Texas City.

you can TRUST a TROSTEL seal

every specification is pilot-tested for *Production Quality*

Because engineered packings and oil seals often require special processing . . . Trostel designs and builds the production tools entirely within its own organization.

As soon as laboratory development is completed, Trostel engineers pilot-test the entire production operation in miniature . . . in order to ascertain the processing and tooling techniques which will retain *in production* all of the special properties and tolerances called for in the customer's specifications.

The result is a packing or oil seal that can be produced to laboratory quality standards . . . in quantities of hundreds, or hundreds of thousands.

A seal you can trust!

Illustrated Bulletin On Request

ALBERT TROSTEL PACKINGS, LTD., Lake Geneva, Wis.

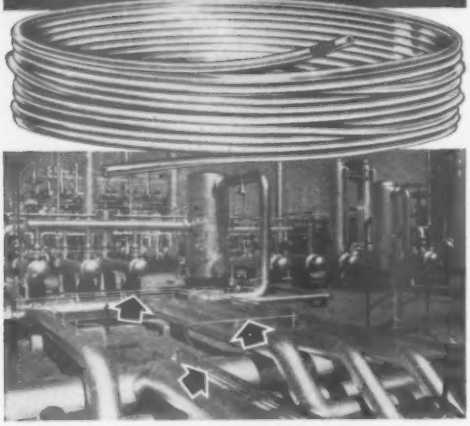
Formerly Division of Albert Trostel & Sons Co., Milwaukee, Wis.

BRANCH OFFICES
NEW YORK
LOS ANGELES
SAN FRANCISCO
SEATTLE · HOUSTON
WORCESTER, MASS.

TROSTEL QUALITY

TROSTEL packings

Save 40% with ALCOA UTILITUBE



Instrument air lines of ALCOA Aluminum Coiled Tube, still in good condition after five years of outdoor service at Sun Oil Company's Delhi (La.) Gasoline Plant, have required no maintenance since they were installed early in 1948.

ALCOA UTILITUBE* is aluminum coiled tube made of a specially selected alloy to provide low cost, easy workability and high fatigue strength.

Alcoa Utilitube offers savings up to 40 per cent over copper . . . has excellent on-the-job forming and flaring properties. It is available in economical, long lengths up to 1,000 feet or more, depending on size. It stands up well under vibration . . . has high resistance to most industrial atmospheres and to many liquids and gases.

Use Alcoa Utilitube for:

- Air for pneumatic and hydraulic control circuits and brake lines.
- Gasoline and fuel oil for internal combustion engines.
- Lubricating oils for engines and machines.
- Fluids for hydraulic systems.

For complete details, write for the new booklet: "Alcoa Utilitube."

ALUMINUM COMPANY OF AMERICA
1003-D Alcoa Building, Pittsburgh 19, Pa.

For process chemicals—catalysts, catalyst supports and desiccants—investigate ALCOA *Chemicals.*

*Registered Trademark, Aluminum Company of America

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

FRONTIER delivers

by truck or rail

WHERE AND WHEN **YOU** WANT IT

* caustic soda (FLAKE, SOLID, LIQUID)	* chlorine
* muriatic acid	* oil well and industrial salt

ANYWHERE IN THE ROCKY MOUNTAIN, MID-CONTINENT AND SOUTHWEST AREAS

ELECTRO-CHEMICAL
Frontier Chemical Company
MANUFACTURERS

GENERAL OFFICES
321 WEST DOUGLAS
WICHITA, KANSAS
PHONE 7-5215

GEARED TO SERVE THE OIL INDUSTRY

Wichita, Kansas • Denver City, Texas • Midland, Texas • Denver, Colorado

NEW

Portable, Hydraulic "GUILLOTINE"

CUTS 1¼" WIRE ROPE!

Guillotine Model 10A with Integral Hand Pump

Tremendous cutting power . . . 22½ tons thrust!

Light weight . . . only 45 lbs. net. Take the tool to the job.

Positive blade retraction . . . will not jam.

Easy hand pump action.

ALSO AVAILABLE WITH

Electric or Compressed Air operated pump

Automatic, power-operated pump assemblies available that are also portable or may be permanently mounted for production application. Special high-power pump available for production cutting over 200 cuts per hour.

Write For Catalog. Dept. OG 4C

MANCO MFG. CO.
BRADLEY, ILLINOIS

NATURAL GAS

New Consolidation Made In Permian-Northern Hearing

WASHINGTON. — A further consolidation of proceedings with a hearing now in progress on related proposals of Permian Basin Pipeline Co., Northern Natural Gas Co., and El Paso Natural Gas Co., has been made by the Federal Power Commission. Hearings opened here April 6.

The commission, because of several common questions of fact and law, consolidated with these proceedings other applications by Northern, El Paso, and Independent Natural Gas Co. for hearing commencing this week, or—if the hearing or taking of evidence in the other matters is not completed by then—at a time and place to be fixed by the presiding examiner or by further order of the FPC.

In the hearings Permian is proposing to build a pipe-line system in Texas and New Mexico through which 300 million cubic feet of natural gas per day will be delivered to El Paso, which will then deliver this gas back to Permian for delivery and sale to Northern.

The proceedings which have now been consolidated with this hearing involve applications by Northern, El Paso, and Independent, all seeking certificates which would make available additional quantities of natural gas to Northern. These proceedings also involve the FPC's suspension of a proposed rate increase by Independent for service to Northern.

The commission previously had consolidated these certificate and rate proceedings, but had not set a time and place for hearing.

Evidence To Be Admitted in Texas Eastern Supply Issue

WASHINGTON.—Evidence proffered by Northeastern Gas Transmission Co., of Springfield, Mass., and Tennessee Gas Transmission Co., of Houston, relating to gas supplies available to Texas Eastern Transmission Corp., of Shreveport, will be admitted as part of the record at the Federal Power Commission hearings on competitive proposals for natural-gas service in New York.

Northeastern and Tennessee proffered the evidence on March 24, with the intention of showing that gas supplies now estimated to be available to Texas Eastern on a system-wide basis are not sufficient to support a finding that the Shreveport company is able to render proposed service to Algonquin Gas Transmission Co., of Boston, and the service which Texas Eastern is authorized to provide to other customer companies.

Upon objection by Texas Eastern's counsel, however, FPC Presiding Examiner Edward B. Marsh ruled that the evidence is not relevant to the issue in the proceedings and refused to permit it to be made a part of the record. Northeastern, Tennessee, and the FPC staff counsel subsequently appealed the ruling to the commission.

The commission in February 1951 authorized Texas Eastern to deliver gas to Algonquin, and at the same time authorized Algonquin to serve certain markets in New England. However, that order subsequently was set aside by a court ruling, and the case is now back before the FPC for a determination of whether Algonquin or Northeastern—or either—should be authorized to serve the markets which had been granted to Algonquin. Tennessee now supplies gas to Northeastern, its subsidiary, for resale in other parts of New England.

NATURAL GASOLINE

Williston System

Gas-gathering, processing layout to be started soon

TIOGA, N. D.—Laying of gas-gathering lines in Tioga and Beaver Lodge fields to connect them with a proposed new natural-gasoline plant near Tioga is scheduled to get under way within the next few weeks.

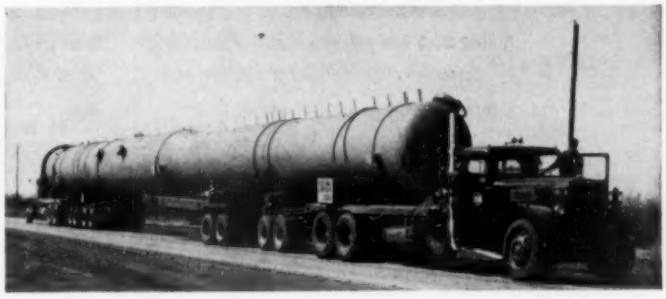
The project involves a 20-mile, 30-in. central line extending from the northern part of Tioga field to the southern portion of Beaver Lodge, plus about 100 miles more of gathering lines ranging upward from 4 in. in diameter.

Contract for the gathering system was awarded last week to Williams Brothers. Fifty-five cars of 24-in. pipe already has been delivered to the plant site near here.

The system will collect and move gas from the two fields to the basin's first gasoline plant, to be built about 1 mile east of Tioga. Contract for construction of this plant has been awarded by Signal Oil & Gas Co., which will collect and process all gas from the fields, to J. F. Pritchard & Co., Kansas City. Actual construction on the gasoline plant is scheduled to start early this summer.

The plant will be designed to process eventually 65,000,000 cu. ft. per day, but until Service Pipe Line Co. builds its proposed crude-oil line connecting the fields with the Mandan refinery of Standard Oil Co. (Ind.), now under way, the plant will operate at about a third that capacity.

The Signal gathering and processing project is expected to involve an expenditure of $10,000,000 within the next 2 years and eventually to represent an investment of $15,000,000. It is the outgrowth of an agreement with Amerada Petroleum Corp., which owns about 85 per cent of the production in the two fields. Under the agreement Signal will extract the liquid hydrocarbons and dehydrate Amerada's gas and will share with Amerada the proceeds from the sale of the liquids. The dry gas will be returned to Amerada for sale.



Push-Pull Technique Moves Tower

Using one big truck to pull and another just like it to push, this bulky fractionating tower was successfully transported to Reef Fields Gasoline Corp.'s new East Vealmoor natural gasoline plant in West Texas. The fractionating tower weights 158,000 lb.

CUT DOWN ON DOWN TIME WITH DRISCOSE* BASE MUD!

From spudding in to contract depth, DRISCOSE helps you make hole faster . . . and with less trouble! As a general rule, fewer bits are required. Dependable viscosity and gel help maintain drilling conditions with easy control of thixotropic properties in conventional or emulsion muds.

DRISCOSE forms a strong, thin filter cake. Controls water loss, reduces danger of channeling and ledges. Soluble in hot or cold water. No fermentation problems. Good stability at high temperatures. Order DRISCOSE from your regular mud dealer . . . cut down on time and over-all mud costs.

DRILL WITH

DRISCOSE*

DRILLING SPECIALTIES COMPANY

BARTLESVILLE, OKLAHOMA

*DRISCOSE is a trademark for Sodium Carboxymethylcellulose.

EXPLORATION

New Mexico Devonian Oil Steps Out

by Philip C. Ingalls

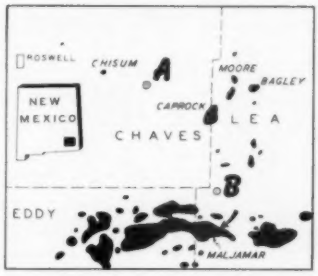
TWO recent developments in Southeast New Mexico have further stimulated interest in the potentialities of the Devonian (Siluro - Devonian) on the northwest shelf of the Permian basin.

1. Republic Natural Gas Co. and Seaboard Oil Co. 1 White Ranch (A on sketch), 34-11s-29e, Chaves County, was completed in the Devonian at 8,730-70 ft. flowing 294 bbl. of 48°-gravity oil daily on ¼-in. choke.

2. Continental Oil Co. 1 Anderson Ranch (B on sketch), 11-16s-32e, Lea County, was completed flowing 492 bbl. of 54°-gravity oil in 6 hours through a 30/64-in. choke from perforations in the Devonian at 13,374-13,400 and 13,408-74 ft. (In addition to Devonian production, this discovery well found a thick oil-saturated section of Permian-Wolfcamp and a thin but powerful gas sand in the Pennsylvanian.)

Republic Natural's discovery is the first for a broad sweep of country through eastern Chaves County where Devonian rocks are climbing northward and westward toward a pinchout just short of Roswell. It is located about 22 miles from the nearest Devonian production to the east and about 12 miles from the nearest Devonian production to the west. To the east are East Caprock and Moore fields, 1951 and 1952 discoveries, respectively. Devonian production is found at about 11,300 ft. at East Caprock and 10,500 ft. at Moore. To the west is Chisum field, a 1950 discovery which found a small volume of high-gravity oil at about 6,500 ft.

As a result of Republic Natural's discovery, this big area can be expected to get additional detailing with the seismograph. Useful reflection seismic work in this area can be accomplished but not without difficulties. Adequate energy returns from below the Hueco (Wolfcamp) are not the rule and seismic pictures in the basal Permian or even into the Pennsylvanian do not necessarily reflect Devonian structure. It is going to take close coordination of seismic, magnetic, and subsurface geologic studies to find the sharp, oil-bearing Devonian structures that evidence indicates must be present.



Portion of Southeast New Mexico.

The Continental discovery, which is on a large seismic structure, jumped Devonian production about 25 miles southward from the East Caprock-Moore area and about 10 miles northward from Buffalo Oil Co. 12-B Baish, 23-17s-32e (arrowed on sketch), a 13,600-ft.-deep Devonian discovery made last year on the flank of a big Devonian structure beneath Maljamar field where Permian production is found at 3,500-4,500 ft. The nearest Devonian production to the east is at Denton, the biggest Devonian field found in the area to date, which lies near the Texas line more than 30 miles away.

Interest in the potentialities of the Devonian of Southeast New Mexico has been growing continuously since the initial discovery in the northeast corner of Lea County at Crossroads, the first pre-Permian field for the province outside the boundaries of the Central Basin platform. That was in 1948. During 1949 four more pre-Mississippian fields were discovered in the northern portion of Lea County: Bagley and Hightower on the west and Denton and Knowles on the east. The following year saw intense interest in the less-than-8,000-ft.-deep Devonian rocks near the pinchout area in Chaves County. The four pools that were found proved to be small and interest shifted back to the deeper areas to the southeast. Now after 2 years comes Republic Natural's discovery to intensify interest in the area midway between the prolific production in Lea County and the marginal production toward the northwest.

Reference

Petroleum Possibilities in Eddy and Chaves Counties, New Mexico, by Phil D. Helmig, The Oil and Gas Journal, October 20, 1952.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SASKATCHEWAN . . . Shell Oil Co. has an indicated Mississippian discovery at 2 Estevan, LSD 7, 18-6-10w2, about 24 miles southwest of the recent Forget discovery. Shell recovered oil on drill-stem test of the Mississippian at about 4,614 ft.

OKLAHOMA . . . Production tests are under way at J. M. Huber Corp. 1 Potter "B," C NW SE 26-6n-21eCM, confirmation test in Beaver County. Crews gaged 6,100 M.c.f. of gas per day from perforations at 6,174-76 ft. in the Morrow sand.

WEST TEXAS . . . In southwest Andrews County Gulf Oil Corp. 1-AU State extended Block 11-Devonian field to the south, flowing 309 bbl. of oil per day. Completion gage was through ½-in. choke from pay section at 8,213-40 ft.

MISSISSIPPI . . . The fourth new gas field has been opened in the Black Warrior basin of northeastern Mississippi at Vaughey & Vaughey 1 U.S.A., 9-12s-4e, northern Chickasaw County. The discovery well flowed 1,060 M.c.f. of gas per day through ⅜-in. choke. The new pool has been named Coleville field.

Denver-Julesburg Having Biggest Year

by John C. McCaslin

Wildcats spurt up 39 per cent over 1952, while their footage is up 51 per cent to 562,490 ft.

THE Denver-Julesburg basin of northeastern Colorado and western Nebraska is enjoying the most successful wildcat and development campaign in its history.

Since the first of the year 8 new discoveries have been completed with 10 others indicating success. Nebraska has new discoveries in the Kimball area, Enders, Southwest Potter area, and at Nichols field in Cheyenne County. Colorado's four new strikes were made in the Roggen, Empire, and Pawnee Creek areas of Weld County, along the general producing trend of Logan County.

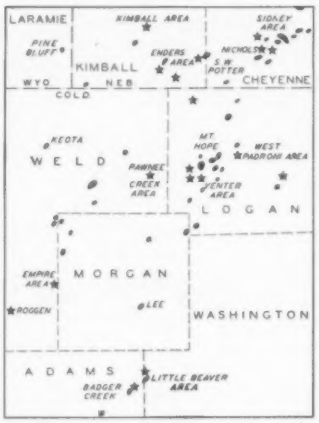
Wildcat completions for the first quarter of this year in the basin total 103, up 39 per cent over last year, while wildcat footage drilled in the basin is up 51 per cent over last year to a total of 562,490 ft.

The basin's most significant discoveries were made in Weld and Adams counties, Colorado, and Cheyenne County, Nebraska. Early in the year Twin Oil Co. opened "J" sand production in the Roggen area, Weld County, Colorado, moving commercial production farther toward the central and deeper portion of the basin. The new discovery at Roggen is the southwesternmost extension of the producing trend in northeastern Colorado. The strike is in the projection of the apparent producing trend extending southwestward from the Goodwin area of eastern Kimball County, Nebraska. Southeastern Weld County, which approaches the deepest portion of the basin, has not attracted much attention until this year.

In Cheyenne County, Nebraska, The Chicago Corp. and Republic Natural Gas Co. opened a new pool that has indications of becoming of the Huntsman-Dorman caliber. The 15-ft. section of saturated "D" sand in the discovery well is an excellent section for the western Nebraska portion of the Denver-Julesburg basin. The new pool is about 4 miles southwest of the closest production at Dorman. The new pool has two producers and two wells in testing stages.

Possible trends . . . The producing areas of the eastern portion of the Denver-Julesburg basin have taken on the appearance of three possible trends.

These apparent trends roughly parallel the southeastern limits of the basin



Map of Denver-Julesburg basin showing existing oil and gas pools. Stars denote new discoveries and indicated strikes.

(Las Animas arch). The westernmost of these trends extends from Keota pool in Weld County to Harrisburg pool in Banner County, Nebraska.

The second trend extends from the Roggen area in Weld County to the Goodwin area of Nebraska, while the third trend extends from Adams County, Colorado, to Morrill County, Nebraska. Most of the basins pools and new discoveries lie within the undefined limits of these trends.

Description . . . The Denver-Julesburg basin, as defined by contours on top of the Dakota, is asymmetrical with a gently dipping east flank, an axis running close to the Rocky Mountain Front Range, and a steeply dipping west flank. The so-called producing trends cut across these structural contours.

All production from the basin's 74 oil and gas fields is from Cretaceous sands of the Dakota-Lakota series. The third Dakota, or "J" sand, is the leading producing formation.

Little Beaver Development

One of the most important developments in the basin this year has been the emergence of Little Beaver field in Washington and Adams counties, Colorado, as one of the potential big fields in the basin.

The latest discovery in the area was made recently by Forest Oil Co. at Badger Creek. The operator established a 28-ft. saturated "D" sand section at the discovery 4 miles southwest of Little Beaver field. The well is completing in the "D" sand.

Little Beaver field, where the excellent development of Cretaceous sands has made commonplace the completion of 400-600-bbl. per day producers, is developing into one of the best producing fields in the basin. It now ranks third in proved acreage among northeastern Colorado fields. Only Yenter and Mount Hope are larger. The field has 15 "D" sand producers in thick sections of highly porous, permeable sands.

Deep Tests in Basin

An important indicated discovery for the future of deep drilling in the Denver-Julesburg basin was made recently at a Keota field test in Weld County, Colorado, by Sherrod & Apperson.

The operators recovered oil on a drill-stem test in the Lyons(?) sand of Permian age for the first commercially apparent discovery in the basin in formations below the Cretaceous sands. Operators have set casing and are preparing to test the Permian shows. The tests will be run in the Lyons(?) sand interval which made 700 ft. of oil in 15 minutes from 8,489-99 ft.

The apparently commercial showings in the Permian at the Weld County test have definitely revived hopes for deep production in the basin where all production has been from the Dakota-Lakota series of Cretaceous age.

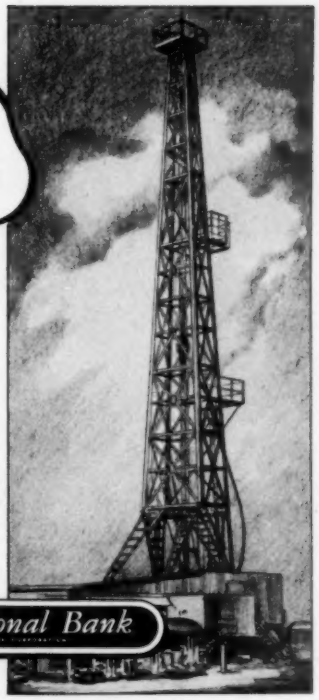
Another deep test scheduled for the basin is reported in the Pine Bluff area of Laramie County, Wyoming, 24 miles northeast of Keota. Ginther-Warren-Ginther will drill 1 Fritz, C SE NE 36-14n-61w, to about 9,000 ft. to test the Permian-Lyons sand.

Few previous deep tests . . . Only a few stratigraphically deep wildcats have been drilled in the Denver-Julesburg basin. Pre-Cretaceous production was first established in the basin at Judy pool along the northwest flank of the Las Animas arch in Cheyenne County, northwestern Kansas, about 2½ years ago. This Pennsylvanian discovery well has since been abandoned.

Considerable exploratory work was done last year along the Las Animas

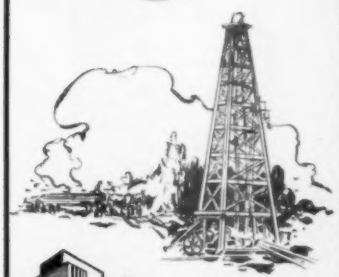
An Oil Loan Service as Modern as...

TODAY'S DRILLING RIG



Modern oil loan service today plays a vital part in the progress of the great petroleum industry. The Oil Loan Division of The Fort Worth National Bank is geared to serve you in all your oil loan requirements.

You're always welcome to discuss your credit needs with our petroleum specialists, well qualified to understand your problems.



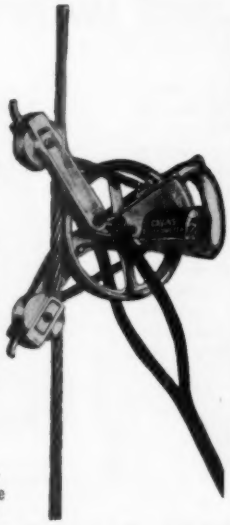
The Fort Worth National Bank

FORT WORTH TEXAS

CAVINS

DEPTHOMETER

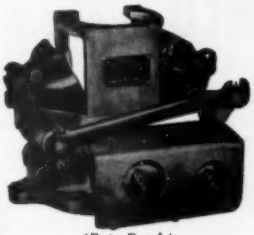
The ideal instrument for taking depth measurements with sand lines while bailing, swabbing, or running a single shot survey. Does away with "stringing-in."



Write for descriptive bulletin

The CAVINS Co.

Main office and factory:
2853 Cherry Ave. Long Beach 6, Calif.
Phone 4-8564
Branch Offices:
Ventura • Santa Maria • Bakersfield • Taft



(Pat. Pend.)

FIRST CHOICE among Production Men

(A Cavins Co. Product)

This is the original and only fully complete automatic AIR-POWERED TUBING SPIDER. Made in two sizes and will handle from 1¼" to 4¾" OD incl. single strings of tubing as well as all combinations of double and triple string installations.

No details have been overlooked to make it the finest tool of its kind. An ideal companion to your air powered tubing tongs, it will work for you from here on out. Full information promptly sent on request.

Advance Oil Tool Co.

2853 Cherry Ave., Long Beach 6, Calif. Ph. 485-64
Export Rep. Roland E. Smith
Mid-Cont. Rep. Hillman-Kelley.

HIGH YIELD *SAVES LONG WATER HAULS*

High Yield Drilling Mud is a balanced mud in dry form. It can be mixed with any water that is convenient to the rig.

High Yield makes a superior drilling mud for use in spudding, drilling core holes, and workovers where a low weight mud is desired with proper viscosity, gel strength and good wall building properties. Processed under exacting laboratory control, High Yield Drilling Mud is resistant to salt and other contaminants often present in make up water. It has proved to be a valuable additive to high pH-lime muds for control of viscosity and filtration properties. High Yield Drilling Mud makes approximately 50 bbls. of 15 centipoise mud per ton and is one of the most economical materials for building a balanced mud. Ask your Magcobar engineer or nearby Magcobar Dealer how you can save long water hauls and rig time with High Yield Drilling Mud.

Our Name is Mud!

Magcobar
Complete
DRILLING MUD SERVICE
DEALER

MAGNET COVE BARIUM CORPORATION

ONE OF THE DRESSER INDUSTRIES

HOUSTON, TEXAS

MAGCOBAR • MAGCOGEL • HIGH YIELD • XACT CLAY • SALT GEL • MY-LO-JEL
MY-LO-JEL PRESERVATIVE • DRISCOSE • MUD FIBER • CELL-O-SEAL • FIBER SEAL
MAGCO FIBER • LEATHER-FLOC • MAGCO MICA • JEL-OIL MUD • JEL-OIL "E"
"E" CONCENTRATE • NOHEEV • TANNATHIN • RED OX LIQUID • ALKATAN
QUEBRACHO • KEMBREAK • MAGCOPHOS • CHEMICALS

arch in the southeastern area of the basin in search of deeper production. In 1952 Continental Oil Co. opened a small Morrow (Pennsylvanian) sand gas pool in the Southwest Eads area of Kiowa County, Colorado. Last year Shell Oil Co. completed a deep test in Mt. Hope pool, Logan County, finding a questionable top of the Permian at 5,694 ft. There have been two deep tests in producing fields of southwestern Nebraska.

The first recovery of oil from the Greenhorn formation, which is encountered before reaching the Dakota, is reported in the Empire Reservoir area of Morgan County, Colorado. Sherrod & Apperson's 1 Endsley filled up with 2,760 ft. of oil on test of the interval 6,123-85 ft. This wildcat is 1 mile east of a recent gas discovery at Empire.

As is the case with deep tests in the basin, little testing of the shallow Greenhorn discovery has been done. The portion of Morgan County where the Greenhorn discovery has been indicated has had very little drilling.

Production Surge

A sharp increase in production of crude-oil in the Denver-Julesburg basin followed the completion of the Platte Pipe Line late last year.

The increased outlet facilities provided by the new pipe line plus the increased development activity in the basin's fields this year have boosted Colorado's Julesburg basin daily average crude production to a new high of over 18,000 bbl. Western Nebraska's production is currently running at about 12,500 bbl. daily, a new record for that portion of the basin, and a 6,000-bbl. gain over the same daily period last year.

CALIFORNIA

Wildcatting Continues At Good Pace In California

California operators continued wildcatting at a good pace, and with better than usual results in March insofar as the number of successful tests were concerned. Five of the eight new discoveries, however, were extensions to existing fields, while three new pools were opened.

The most significant new discovery was a Miocene sand pool opener in the Leffingwell area east of Los Angeles, about midway between Santa Fe Springs and West Coyote, by Hathaway Co. The new discovery was completed flowing 200 bbl. of 35°-gravity oil per day at 8,486-8,686 ft. A north offset and a ¼-mile south extension attempt soon will give a better idea of the find's importance.

New Tejon Hills Pool

O. M. Slosson was in process of completing a new pool discovery about ½ mile west of Tejon Hills production in southeast San Joaquin Valley. The wildcat, designated B Core Hole, in SW NE 21-11n-18w, was bottomed at 2,628 ft. After having set 7-in. casing at 1,607 ft., the operator was preparing to perforate at 1,391-1,416 ft. Successful completion would add a new Valvulineria californica pool, middle Miocene.

Deeper Pay Indicated For Lost Hills Field

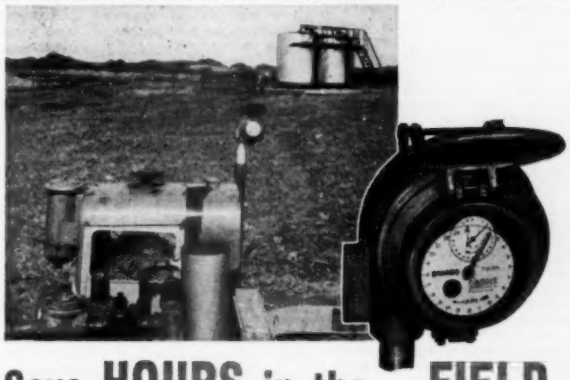
Oil shows at 6,034-6,138 ft. in Standard Oil Co. of California deeper zone test at Lost Hills, central San Joaquin Valley, indicated Carneros (Lower Miocene age) production will be added to the old field's shallow pays.

A 1¼-hour test was made after topping the Carneros zone at 6,022 ft., with gas reaching the surface in 19 minutes. When the tool was pulled at the end of the test 1,900 ft. of fluid was recovered, including 1,250 ft. of 33°-gravity crude. No free water was recovered so that after the test Standard prepared to drill deeper.

Discovered in 1910, all Lost Hills production to date has been from 1,500 to 2,000-ft. Pliocene sands. An 11,080-ft. test was drilled by Standard on the southeast end of the 7-mile long field, but Miocene and Eocene pay possibilities along most of the anticlinal structure have not been tested. The potential discovery, 16 "Well," is in NW SW 29-26s-21e, approximately in the center of the field.

Two Ventura Tests Dry

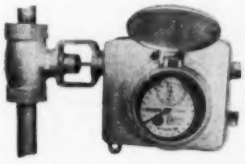
Two deep tests in the Santa Paula area of Ventura County were abandoned. Near Santa Paula, in 30-4n-29w, Standard aban-



Save HOURS in the FIELD

ENARDO TIME CYCLE SWITCHES

Enardo "MB" and "A" model time-cycle switches pay for their cost in a matter of weeks by drastically decreasing return trips to shut down equipment. These automatic clock mechanisms, provided in 12 and 24 hour operating cycles, can be used to start or stop pumping engines . . . lighting circuits . . . electric motors . . . etc. Normal operating capacity for the "A" Mercury tube switch is 450 Watts open or closed circuit. Tube switches of higher wattage are available on request. The "MB" micro-switch operates at 60 Watts D.C. or 1250 Watts A.C., open or closed circuit. Switches are dust, fire, tamper and explosion proof. Write for Enardo bulletins 10-01, 10-03.



ENARDO CLOCK SHUT-OFF VALVE

The Model "W" Enardo Clock Shut-Off Valve is designed to control the flow of low-pressure gas or liquid and to shut off the supply at a pre-determined time. It is completely automatic and can be safely used on any gas or liquid flow line where pressures do not exceed 100 lbs. Timing mechanism on the valve can be supplied for either 12 or 24 hour operating cycles. The assembly consists of a stainless steel trimmed valve with a cast iron body mounted on a housing containing the valve tripping linkage and clock actuating mechanism. Write for bulletin 10-05.

ENARDO manufacturing company

BOX 1647 • TULSA, OKLAHOMA

Truth in Advertising Builds Confidence.

doned 81-30 Thorpe at 13,780 ft. On the east edge of its deep Sespe pool at Torrey Canyon, Union Oil Co. 90 Torrey was dry at 9,035 ft. This was the company's first dry hole, after having successfully completed five good producers in the 3,000-ft. section of nonmarine Sespe at about 9,000 ft.

Mountain View Find Sets Off Deepening Program

Discovery of a deeper zone on the west side of Mountain View field, 5 miles southeast of Bakersfield, has touched off a minor flurry of well deepening. Standard Oil Co. of California was preparing to deepen an east offset and Hancock Oil Co. was under way with two northern offsets. All originally had been completed in a 5,400-ft. pay. In addition M.J. M. & M., which drilled the 7,300-ft. discovery, was starting a two-location northwest extension.

The latter's 3 Wible, in NW NE 23-30s-28e, was completed in 52 ft. of Nozu sand (Middle Miocene) at 7,354 ft. On the first 24 hours of production the well flowed 385 bbl. of 36.4°-gravity crude. It had been deepened from 5,475 ft. In addition to Hancock and Standard, other companies which may benefit from the discovery are Pacific Western Oil Corp. and Union Oil Co.

Texaco Testing Two Wells

The Texas Co. had set pipe on two Los Angeles basin wildcats which might result in new pool discoveries. In SE SW 2-4s-13w, about ¾ mile southeast of Dominguez production, 1 Del Amo had been plugged at 8,680 ft. to shut off water after drilling to 8,724 ft. According to field reports the potential extensioner yielded good oil shows on formation tests.

The other Texas Co. wildcat being watched was 1 Dinkler in 7-4s-9w, about 2½ miles south of Richfield production and a similar distance east of the town of Anaheim. Drilled to 7,392 ft. and plugged back to 5,743 ft., the wildcat was being placed on the pump to make a thorough test of shows below 5,590 ft., where 7-in. casing was set.

CANADA

CANADA

Oil Recovered At Williston Tests In Saskatchewan

Two wildcats in the Williston basin area of southeastern Saskatchewan, about 85 miles southeast of Regina, have found oil encouragement, one in the form of recovery of approximate 26°-gravity oil and the other with a showing of oil-cut mud. Both wells are being drilled by Shell Oil Co., are located between Estevan and Weyburn, and found their encouragement in the Mississippian limestone.

The most promising of the two exploratory ventures, in terms of showings so far obtained, is the southernmost of the two wells, Shell 2 Estevan, LSD 7, 18-6-10w2, 6 miles northeast of Midale railpoint and 27 miles southeast of Weyburn. First Mississippian drill-stem test, from 4,602-14 ft., gave up a pipe recovery of 75 ft. of oil and 15 ft. of drilling mud. Second test, from 4,614-24 ft., yielded a recovery of 60 ft. of oil and 90 ft. of heavily oil-cut mud. Coring and testing is being continued.

Nearest previous oil production to 2 Estevan well is the Tide Water group's Forget Mississippian oil discovery well, which lies 27 miles to the northeast. The Socony-Central-

Arrow indicates the apparent Mississippian discovery in the Estevan area, 27 miles southwest of the recent Forget strike in Saskatchewan.

Del Rio-Ratcliffe Mississippian oil discovery well is 42 miles to the southwest.

The other encouraging well is Shell 1 Estevan, LSD 6, 24-8-9w2, 15 miles northeast of the No. 2 venture. The 1 Estevan is 4 miles southwest of Stoughton railpoint, 12 miles southwest of the Forget discovery and 33 miles due east of Weyburn. Drill-stem test from 4,174-96 ft. for 2 hours, gave up 100 ft. of oil-cut mud. Coring is continuing.

On the Pigeon Lake Indian Reserve, 38 miles southwest of Edmonton, Stanolind Oil & Gas Co. and the California Standard Co. found a 10,000,000 cu. ft. per day natural gas flow in top of the D3 Devonian reef. Accompanying that gas flow was a distillate spray, and recovery after a 1-hour test was 145 ft. of distillate and 1,000 ft. of gas and distillate-cut mud.

This Pigeon Lake well, Stanolind-Cal Standard No. 2, LSD 15, 24-46-28w4, found D3 reef at 6,586 ft., or 3,738 ft. below sea level, placing it 100 ft. higher than the team's No. 1 well which is 1½ miles to the southwest, and 31 ft. lower than the Texaco A-1 Pigeon Lake D3 Devonian oil discovery to the north. The Stanolind-Cal Standard first well at Pigeon found a sizable wet gas zone, but only a thin oil column, and was capped as a gas well, due to the high gas-oil ratio. String of 7-in. casing has been run at the No. 2 well, and crew is currently drilling out cement, preliminary to deepening in the D3 reef, in search of an oil column.

The Maygill-Hy Charger 1 Henderson Holdings basal Cretaceous step-out oil success in the Campbell-Namao area of central Alberta, has been placed on steady production.

This venture, on LSD 7, 34-54-25w4, is ¾ mile west of an abandonment and ⅞ of a mile southwest of Cretaceous oil production. Drill-stem tests in the Cretaceous, around the 3,720-ft. level, gave up a substantial recovery of oil during March. Gravity of the oil is 34°.

Pacific Petroleums, Ltd., and associates have found natural gas at another driller in their development program in the Fort St. John area of northeast British Columbia. The well found its gas in the upper section of the Triassic, and crew is now heading down in search of lower objectives.

This most recent gas success is Pacific 22 Fort St. John, LSD 10, 33-82-17w6, 1¾ miles south-southeast of No. 12 gas well and 11½ miles southeast of Fort St. John town.

Initial drill-stem test in the Upper Triassic, from 3,855-69 ft., flowed natural gas in 5 minutes, at maximum rate 887,000 cu. ft. daily.

Socony-Vacuum Exploration Co. has encountered a slight showing of oil-cut mud in the Cardium formation at its wildcat in the Pembina area of central Alberta, 65 miles southwest of Edmonton and 46 miles west of Wizard Lake D3 Devonian oil field.

The wildcat, Socony-Seaboard 1 Pembina, LSD 4, 16-48-8w5, is 15 miles northwest of Canadian Delhi et al 1 Minnehik Madison limestone wet gas discovery and 36 miles south of Select Oils, Ltd.'s Chip Lake wet gas strike. Forty-minute drill-stem test in the Cardium interval 5,335-76 ft. gave a recovery of 110 ft. of heavily oil and gas-cut mud.

EASTERN CANADA

Prospect in Canadian Arctic

OTTAWA.—A report just issued by the federal mines department on survey work carried out last year shows good prospects of oil and gas on Cornwallis Island, more than 500 miles north of the Arctic Circle. The report states that the party found numerous petroleum residues, and adds that conditions seem to be favorable for the occurrence of oil and natural gas in this or the adjoining areas.

There, are, however, great physical difficulties to drilling on Cornwallis Island. It lies some 1,650 miles north of Winnipeg at the conjunction of the 75th parallel of latitude and 95th degree of longitude, and polar winds and temperatures would impose severe hardships on men working there.

Farther west and south, survey work indicated that much of the Mackenzie district, comprising 256,000 sq. miles, has oil possibilities, in adition to the Fort Norman area already tested.

During the year the department's survey parties traced and mapped oil and gas formations in southwestern Ontario and particularly in Essex, Kent, and Lambton counties.

Gaspe... In the Gaspe Peninsula of Quebec, 1 Asphaltic Base drilled by Gaspe Oil Ventures and associate companies on the Galt Brook dome, set casing for water shutoff at 612 ft. and deepened, encountering a softer formation at 647-50 ft. with some porosity and a considerable show of gas. While bailing was continued the gas flow increased with pressure sufficient to impede the use of the bailer. aBiling and testing are continuing.

Continental 1 Deep Test on the Galt Brook dome has resumed after cementing casing at 2,018 ft. The 2 Bald Mountain on the Bald Mountain anticline, is below 4,820 ft. The 1 Tar Point on the Tar Point anticline, is below 6,870 ft. Quebec Oil 2, on the Power-Joncas dome is below 4,685 ft.

Ontario... In Lambton County, McMaster Drilling Co. hsa abandoned at 2,300 ft. a test, started last year, for Imperial Oil near Watford and has moved to the Robert Capes farm, in the northwest corner of Brooke Township, west of Watford, where a new test will be drilled to 2,800 ft.

Possibility of deep drilling for oil and gas in the Delhi district of Norfolk County are indicated as an outcome of exploratory tests put down by affiliates of United States Steel in a search for iron ore at depth.

The steel tests have been mostly carried below 5,000 ft. depth, and it is indicated that Dominion Natural Gas Co., extensively interested in shallow gas production in Norfolk and Haldimand, is securing oil and gas acreage as a result of indications encountered in one of the deep tests. A Fort Erie company is also interested, and an independent operator and driller has recently leased upwards of 1,400 acres in the vicinity of Delhi.

Many years ago, a short-lived shallow oil production on a small scale was encountered near Tillsonburg; and since then fairly widespread drilling in Norfolk has encountered

gas, but no oil, in the Clinton and Medina formations, at depths between 1,000 and 1,500 ft. There has been little or no deep drilling. It is now stated that the U. S. Steel exploratory drilling has indicated gas products around 4,000 to 5,000 ft. and oil prospects at 9,000 ft.

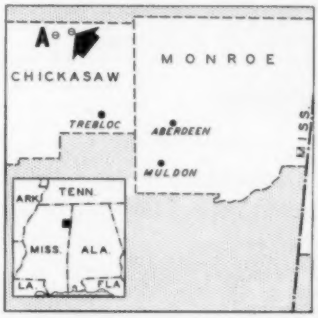
MISSISSIPPI

Black Warrior Basin Gets Fourth Gas Field

Completion of a gas producer by Vaughey & Vaughey at their 1 U.S.A., a rank wildcat in northern Chickasaw County, has given the northeastern Mississippi portion of the Black Warrior basin its fourth field, the third this year, and is providing additional encouragement for the expanding exploratory program in that geological province.

This new productive area has been designated as the Coleville field. The discovery well, located in 9-12s-4e, flowed, on its completion gage, at the rate of 1,060,000 cu. ft. of gas per day through ⅜-in. choke with 308 psi. pressure on the tubing. Gas was relatively dry.

Production, as in previous discoveries, is from the Mississippian Chester section, which was drilled to a total depth of 2,740 ft. The specific pay zone is the Evans sand, open through casing perforations at 2,409-21 ft.



Arrow points to Vaughey & Vaughey 1 U.S.A., newly completed discovery well of Coleville gas field, in Black Warrior basin. "A" is wildcat test being started by Sinclair Oil & Gas Co. at 1 Epperson. Black dots are the basin's previously discovered gas fields.

The discovery follows closely one made by Carter Oil Co. at its 1 Clem Baskin heirs in the Trebloc area, 15 miles to the southeast in the southeastern part of the same county. The latter well, completed in mid-March, flowed at the rate of 5,420,000 cu. ft. of gas and 32 bbl. of condensate per day through 26/64-in. choke with 1,331 psi. pressure on the tubing.

Pay zone of the Carter discovery well is the Carter sand, open at 4,300-60 ft. The Evans sand of the Vaughey well stratigraphically is more than 600 ft. below the Carter sand, but at the location of the latter well, updip in the basin, is found at much shallower depth.

Earlier this year, in January, Shell Oil Co. opened gas production in the Aberdeen area, 11 miles east of the Trebloc discovery, in western Monroe County, and now is starting its second well. The first of the basin's present four fields was opened less than 15 months ago by Union Producing Co. at Muldon, about 6 miles southwest of the Aberdeen field. Union now is drilling its third well in that field.

Currently watched is a deep test being drilled by Carter Oil Co. in Clay County adjoining Chickasaw County on the south and deeper in the basin. This test, 1 McFaddin, in 36-16s-5e, approximately 15 miles almost due south of Carter's Trebloc discovery well, at latest report was drilling below 9,230 ft. It has had promising gas showings in a succession of zones, but sands have been tight. It logged top of the Mississippian at 7,122 ft. with surface elevation of 200 ft., and had the Carter sand of the Trebloc well at 8,644 ft.

In the meantime, Justiss-Mears Oil Co. has gone back into an old hole in northwestern Chickasaw County, near the Calhoun county line, in which gas showings were encountered but in which formations orig-

I sure lost my head about that elevator

...and no wonder, because it *has everything!* ★ It has a slanting hinge pin for self-closing – it opens and *moves away* from the pipe when you unlatch it – and it *stays open* in proper position for easy handling. ★ Guards on the man-size handles protect hands from contacting the links—and it *stays* safely locked until *you* open it. ★ What elevator is this? Why, the Web Wilson "Balanced" Center Latch Elevator. ★ And who is the headless man? It's Johnny Deaver at New Iberia, Louisiana 155 (P.O. Box 79) and he can *still* talk to *you*.

M-SCOPE PIPE FINDER

MODEL AB
ONE MAN OPERATION
HEAVY DUTY PERFORMANCE
IMMEDIATE DELIVERY
ONLY $149.50

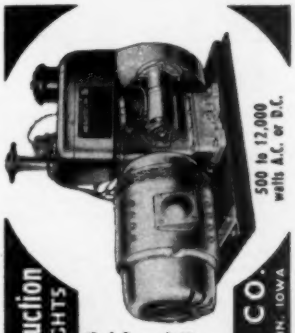
FISHER RESEARCH LAB., Inc.
PALO ALTO CALIF.

THE INFERNO Firing Control Will Do These Things For You

- Cut Labor Cost
- Save on boiler repairs
- Cut Fuel Bills
- Maintain constant pressure
- Fires with either oil or gas.

Write for Bulletin No. 8-B for further details.

THE INFERNO CO.
Box 1138A
115 RICOU St.
SHREVEPORT, LA.



Power Plants Speed Construction
USE POWER TOOLS—FLOOD LIGHTS

WINPOWER PORTABLE ELECTRIC PLANTS provide a dependable, low cost power source . . . speed up work performance by operating time and labor saving power tools.

WINPOWER NITE-HAWK units give power plus flexible floodlights. Every contractor should use these high efficiency, quality built plants.

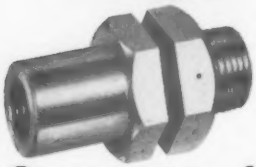
WRITE FOR LITERATURE AND PRICES

500 to 12,000 watts A.C. or D.C.

WINPOWER MFG. CO.
NEWTON, IOWA
TEL. 236

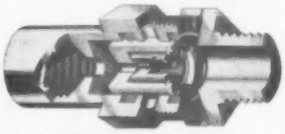
Now Available!

DEUBLIN
Quick-Release
VALVE



Guaranteed Not to Chatter!

Here is the CHATTER-PROOF, trouble-free quick-release valve you have been waiting for. Compact and precision-built, the Deublin valve is designed to handle air pressure from 0 to 250 p.s.i. on pneumatic clutches up to 1500 H.P.

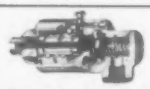


2⅛" over-all length; weight, 1½ ounces.

Advanced engineering and performance features make this Deublin unit outstanding.

- ✓ It is guaranteed *not* to CHATTER.
- ✓ Its light weight permits its use on rotating elements without disturbing dynamic balance.
- ✓ The Deublin built-in orifice prevents accidental removal of the orifice from the line and eliminates possibility of pressure equalization which causes CHATTER.
- ✓ Double-piston design assures smooth, positive, quick releasing action.

Ask your local supply store for the complete details on the Deublin Quick-Release Valve.



Also get facts about the dependable Deublin Rotating Air Unions.

DEUBLIN COMPANY
Precision Products for the Petroleum Industry
1155 Waukegan Road, Glenview, Illinois

inally were considered too tight to produce. The results obtained in establishing commercial production from tight sands in the Treblock and Coleville discovery wells by means of formation fracturing has led operators to believe that similar results may be obtained by fracturing in this well. The hole, drilled to 4,064 ft., has been cleaned out to bottom and casing, run to 4,030 ft., will be perforated opposite the Carter sand around 3,400 ft., and the formation fractured.

Two other wildcats are drilling in this county, one by Carter Oil Co. at 1 Fowler-Langley unit, in 22-13s-2e, about 4 miles southeast of the Justiss-Mears operation, and the other by Sinclair Oil & Gas Co. at 1 Epperson, in 13-12s-3e, 4 miles southwest of the Coleville discovery well.

LOUISIANA

NORTH LOUISIANA

Lincoln Clay Well Has Good Cotton Valley Gas Flow Rate

Tests are continuing at Southwest Gas Producing Co. and Feazel Interests' Cotton Valley pay discovery in Clay field. The 1 Sherrard, N½ NW SE 10-17n-3w, Clay field well in southern Lincoln Parish, recorded a flow of 4,000 M.c.f. of gas per day with an unestimated amount of condensate. Production is from open hole at 10,063-72 ft. in the upper part of the Cotton Valley formation.

Clay field's discovery well produces from a sand in the basal Travis Peak formation 1 mile to the east of the new Cotton Valley discovery.

SOUTH LOUISIANA

New Producing Area For St. Landry Parish

Discovery of a new producing area located a mile north of the Lewisburg field and 2½ miles south of Lawtell, in St. Landry Parish, is indicated by preliminary production tests by Atlantic Refining Co. at its 1 Gardner. Location is in 5-7s-3e.

From initial casing perforations at 10,162-72 ft., the well made 50 bbl. of 38.9°-gravity oil during a 30¼-hour test. Hole then was plugged back and casing perforated at 9,305-09 ft., where the well flowed 2,600,000 cu. ft. of gas and 35.7 bbl. of 38.5°-gravity oil per day through ¼-in. choke. Squeezed, and reperforated at 9,300-05 ft., it flowed 51.5 bbl. of 50°-gravity distillate with 3,580,000 cu. ft. of gas per day through ¼-in. choke.

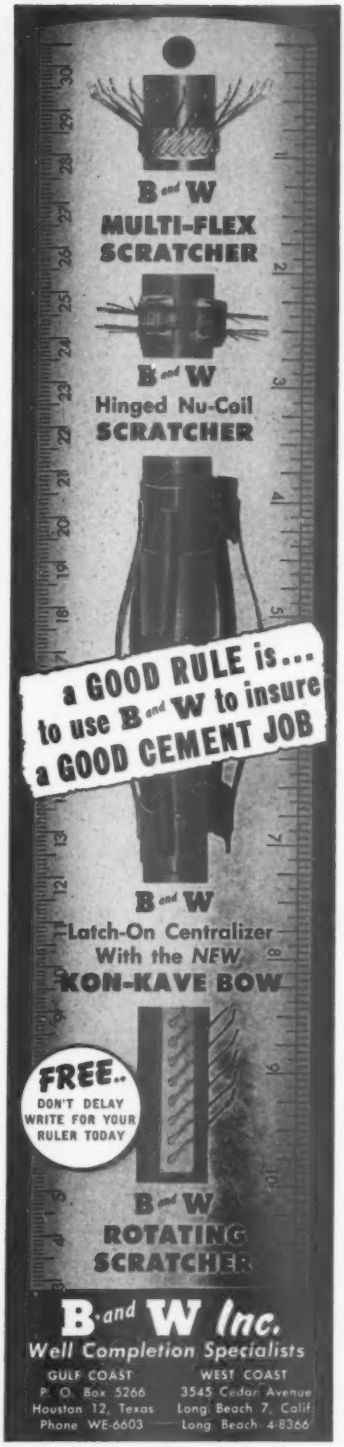
Original total depth was 10,992 ft. with 5½-in. casing cemented at 10,277 ft.

Deep Production Spreads At Napoleonville Dome

Production of the Napoleonville dome in Assumption Parish is being extended on the southeast flank with a deep gas-condensate well being completed by Texas Gulf Producing Co.

The well, 1 Armelise, located in 44-12s-13e, ¾ mile from nearest other production on the dome, flowed an ungaged volume of gas and condensate during a drill-stem test of casing perforations at 10,450-64 ft. Flow was through ¼-in. choke with pressure of 3,875 psi. Total depth is 11,105 ft. with bottom of the casing at 10,580 ft. Tubing is being run for completion.

The same company, earlier this year,



opened production a mile off the northwest flank of the dome.

Bourg Field Jumps Mile

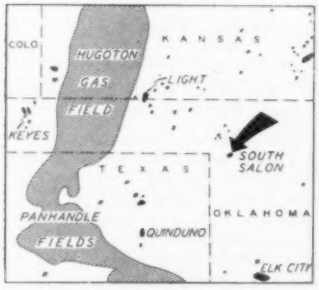
Production of the multi-pay Bourg field, in Terrebonne and Lafourche parishes, has been extended a mile northward by Tide Water Associated Oil Co. at its 1 Delta Securities, in 35-17s-18e. Location is in Lafourche Parish.

During a drill-stem test, open 125 minutes, of casing perforations at 11,787-92 ft., the well flowed at the rate of 3,000,000 cu. ft. of gas per day with 20 bbl. of 58.5°-gravity condensate per 1,000,000 cu. ft. Flow was through ¼ and ⅛-in. chokes under 2,100 psi. pressure. Hole, drilled to 13,255 ft., is plugged back to 11,792 ft.

OKLAHOMA

New Pay for South Salon Pool in Ellis Indicated

A stepout 1 mile south of the discovery well of South Salon gas-distillate pool in Ellis County is establishing first oil production in the Pennsylvanian Big lime. Carter Oil Co.'s 1 Irvin, C NW SE 27-23n-24w,



Arrow indicates South Salon gas-distillate field in Ellis County where first oil production from Big lime (Pennsylvanian) is being established at a stepout 1 mile south of the pool.

indicated new pay discovery for the area, swabbed 17 bbl. of oil in 13 hours with 50 M.c.f. of gas per day from 7,188-96 ft. The well previously flowed 1,000 M.c.f. of gas per day with some water from perforations at 8,215-36 in the Morrow sand.

The pool was opened last year at Carter's 1 Rosendale, C NW SE 22-23n-24w, flowing 200 bbl. of distillate and 1,720 M.c.f. of gas per day from the Morrow sand at 8,455-8,510 ft.

New Golden Trend Discovery Reported in Garvin County

Phillips Petroleum Co. has a prospective new oil discovery or a possible extension at 1 Arnesen, C NW SE 2-3n-4w, Garvin County. The indicated success is located 4½ miles south of Lindsay, and is 1½ miles northwest of Northeast Purdy pool, a Hart and Springer sand pay area that is developing rapidly.

A drill-stem test at 8,659-8,731 ft. flowed gas in 10 minutes and recovered 120 ft. of oil plug, 840 ft. of mud-cut oil and oil-cut mud. The Hart sand was logged at 8,652-87

WORLDS
OF EXPERIENCE
IN THE WORLD-WIDE
PETROLEUM INDUSTRY...
INTERNATIONALLY-KNOWN
PRESSURE CONTROL
SERVICE AND
EQUIPMENT
Otis originated "pressure control" of oil and gas wells twenty-five years ago. Without hesitation you can put your confidence in our reputation, in our many years' experience, and in our continued leadership of an indispensable phase of modern production practices. Otis is the one organization in the industry with a full complement of pressure control facilities . . . manufacturing . . . marketing . . . and field service crews.
OTIS
OTIS
OTIS
OTIS
OTIS
OTIS PRESSURE CONTROL, Inc.
6612 Denton Drive • Dallas, Texas
Branch offices throughout the oil country
Export Dealer: Otis Pressure Control Export, Inc.
Our Silver Anniversary Year

RUGGED
RELIABLE
Gearmotors

DOUBLE REDUCTION, TYPE RM

THESE Industrial Gearmotors are built to stand up under all conditions. Here's why – quality construction throughout, finest alloys for gears and pinions, accurate alignment, heavy-series ball bearings, rigid cast iron frames and precision production.

A. O. Smith Gearmotors are offered in twenty-one standard speeds ranging from 780 RPM down to 13.5 RPM and in ratings from 1 HP to 50 HP. Standard AGMA Classes I, II and III. Special output speeds and mounting arrangements available on request.

FREE – For 12-page engineering bulletin, write A. O. Smith Corporation, Electric Motor Division, 1000 Webster St., Dayton 4, Ohio. Or, Western Division, 5715 SMITHway St., Los Angeles 22, Calif.

A.O.Smith
ELECTRIC MOTOR DIVISION

Factories at Tipp City, Ohio and Los Angeles, California
Offices in Principal Cities
International Division, Milwaukee 1, Wisconsin

ft. The Springer sand, which was topped at 9,440 ft., apparently had no showings.

New Logan Discovery

A new second Wilcox sand discovery 2 miles south and 1 mile east of Evansville, Logan County, north central Oklahoma, is indicated at Jordan Petroleum 1 Harback, SW SW SW 19-15n-1e. The prospective discovery is flowing at an initial rate in excess of 15 bbl. of oil per hour from the perforated second Wilcox sand pay topped at 5,830 ft.

Panhandle Activity Continues

A new stepout test in the area between Floris pool, Beaver County, and a new pool to the northwest in 26-6n-21eCM, will be drilled by Panhandle Eastern Pipe Line Co.

Operations will begin soon at 1-25 Clapp, C SE SE 25-6n-21eCM, with the test to go to 6,700 ft. Southeast of this new well Panhandle Eastern has 1 Humiston, C SE NW 31-6n-22eCM, nearing completion. This well is off the west flank of Floris pool.

The new location by Panhandle Eastern is located 1½ miles southeast of a recent pool opener, J. M. Huber Corp. 1 Potter, C SE NW 26-6n-21eCM. Huber's well flowed 67 bbl. of oil per hour during Marmaton (Pennsylvanian) sand tests from open hole at 5,640-94 ft. Huber's 1 Potter "B," C NW SE Section 26, is entering the deeper levels. This well is the southeast offset spot to the discovery.

Activity in North Sturgis pool, Cimarron County's newest field, is picking up with a new operation at Columbian Fuel Corp. 1-D C. J. Purdy, 5,000-ft. test in C NW SE 29-6n-9eCM. Columbian Fuel Corp. has two other active operations in the area, one in the immediate field area, and one in Section 23.

North Sturgis pool was opened last winter by Coltexo Corp. at 1 Purdy, C NW SE 20-6n-9eCM, flowing 33,000 M.c.f. of gas per day from the Pennsylvanian Morrow sand perforations at 4,240-53 ft. In Section 19, C NW SE, Coltexo has a test at 1-B C. J. Purdy.

New Discovery in Beaver

Carter Oil Co. 1 Kinnamon, C SE NE 23-5n-23eCM, 1 mile south of Forgan in the northern part of Beaver County, Oklahoma Panhandle, flowed oil and gas on a drill-stem test at 5,865-74 ft.

The indicated pool opener recovered 90 ft. of oil and 85 ft. of gas and mud-cut oil. Total depth is 6,011 ft. and another drill-stem test was being made. The possible discovery well is 1 mile north of abandoned Beaver-Panhandle pool, where production was opened in 1952 in the Marmaton and then later in the Kansas City lime.

KENTUCKY

EASTERN KENTUCKY

Another gas discovery well has been drilled in Bell County, southeastern Kentucky by North American Petroleum Co. Located some 5 miles west of their recently completed Big lime gas discovery on Pioneer Coal Co. land, new well gaged 700,000 cu. ft. of gas daily from Big lime 2,334 to 2,350 ft. and 400,000 cu. ft. daily from Corniferous lime 3,040 ft. to 3,047 ft. Total depth was reported at 3,090 ft. Geographically test falls in 9-D-71, 6 miles northeast of Pineville, Ky.

In Magoffin County and located on

PUMPING PROBLEM

REDA
MAY HAVE THE *RIGHT* ANSWER

. . . from ⅓ HP to 240 HP . . . from 20 bbls to 17,000 bbls . . . from 200′ to 10,000′ and more . . . Yes, a REDA may do that pumping job BETTER . . .

Reda Pumps are accepted as original equipment, or replacement equipment, because they produce at a lower cost per barrel of fluid. Whether it's large volumes from shallow depths, or modest volumes from great depths, Reda Pumps provide operating savings.

IMPROVED DESIGN:
Constant research and design improvement are responsible for lengthened operating life; corrosion resistance, low labor cost per barrel of fluid produced.

IMPROVED EFFICIENCY:
Greatly improved overall efficiencies have improved Reda performance as much as 25%; a substantial operating saving.

If you have a pumping problem, our engineering staff is always ready to assist you. Phone or write:

REDA
PUMP COMPANY
BARTLESVILLE, OKLAHOMA

be 304 ft. high structurally to the Anderson Ranch well. It was drilling ahead below 12,633 ft., on a Devonian contract.

ROCKY MOUNTAIN

COLORADO

Apparent Morgan County Discoveries Tested

Morgan County has two apparently commercial discoveries now nearing test as the trend of successful wildcats in the Denver-Julesburg basin continues to the south and west from the more established areas of Logan County, and western Nebraska. One of the two current discoveries apparently produced from a formation not previously known to be productive in this area.

Sherrod and Apperson, Tulsa independents, tested their second apparent discovery in the basin for the current year at 1 Endsley, NW NW NE 6-3n-60w, in the Empire Reservoir area of Morgan County. The recovery from the interval 6,123-85 ft. was 2,760 ft. of oil, with tool open 1 hour. This test was in the Greenhorn lime, according to the operator, and may mark the opening of a new producing horizon for the basin. A second test from 6,183-6,230 ft. recovered 600 ft. of oil and oil-cut mud, and 200 ft. of mud in 2 hours. Flowing pressure on the first test was 490 psi.

Shows of a very slight nature have been reported in the Greenhorn in this general area of the Denver-Julesburg basin in previous wildcats, but the formation has been very infrequently tested in work done in that area in the past. The operator is coring below 6,310 ft., and will test the Cretaceous sand zones in which production is usually expected before attempting completion.

A second indicated discovery in this county is Roden, Darden & McRae's 1 Olsen, C SW NE 23-1n-55w, which recovered oil from the "J" sand. Test of the zone 4,895-4,907 ft. had gas at the surface after 5 minutes and flowed at the rate of 36 bbl. of oil per hour under flowing pressure of 750 psi. Top of "J" sand was called at 4,899 ft. and the operator is running pipe with total depth at 4,907 ft.

Weld County Deep Wildcat Starts Permian Tests

Unconfirmed reports indicate that Sherrod & Apperson have begun perforating and testing in Permian at 8 Gillette, C NW NW 9-9n-61w. The wildcat, deep zone prospector in Keota field, Weld County, had apparently commercial recoveries of oil from the Lyons (?) sand at about 8,489 ft. and cored staining in the Big Blue, also of Permian age. The operator has not released complete data, but is now reported perforating and testing lower zones, presumably the Big Blue at about 9,100 ft. Recoveries from this section were reported as only mud, with no shows. Principal show in the well, first indicated pre-Cretaceous success in the basin was the Lyons sand recovery.

MONTANA

Eastern Montana Activity Trend Is Up

Carter Oil Co. made location for 1 Danielson, C NE SW 12-36n-47e, in the Whiskey Butte area of Daniels County, which becomes the latest in a series of wildcats through the northeastern Montana area which began after discoveries in southern Canadian portions of the Williston basin about a year ago. The location is about 12 miles north of a 1952 failure by Los Nietos-Hancock-Signal, which found shows through Mississippian formations but had no commercial tests.

North of East Poplar field, Roosevelt County, Empire State Oil Co. is now drilling below surface pipe at 1-C Smith, SW SE 8-29n-51e. The wildcat is 2 miles north of production in the field, and is one of the first tests to attempt to extend production to the north along the general East Poplar trend, beyond the area developed at the present time.

Carter Oil has spudded 1 Lowe, C SW NW 13-28n-50e, west of production in the East Poplar area. This operator has done previous work through the West Poplar area without success.

In McCone County, another Williston basin wildcat of considerable interest has been located. Shell Oil Co. made location for NPRR 12-5 C SW NW 5-21n-48e, about 3 miles southwest of production at the Southwest Richey discovery.

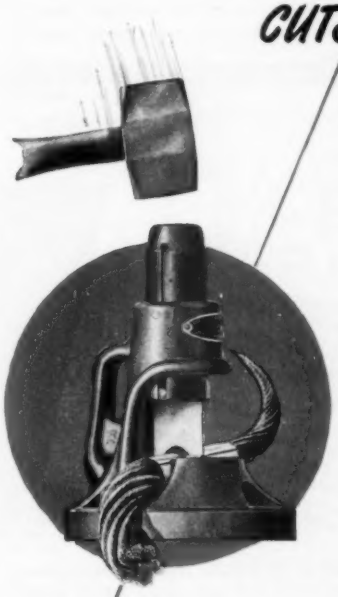
WYOMING

Gulf Has Big Horn County Discovery

Gulf Oil Corp. is preparing to test an apparent discovery south of production in the Manderson Unit in Big Horn County, Wyoming. The well, 1 Thomas, C S/2 NE SE 33-50n-92w, is outside the unit, but still on the Manderson structure, where produc-

Morse-Starrett
WIRE ROPE CUTTER

CUTS WIRE ROPE



FASTER...
Especially designed cutting blade and dies assures fast cutting action... The hammer principle eliminates any special skill requirements.

CLEANER...
No jagged ends. The wire rope is cut with ends smooth and clean for perfect threading or splicing.

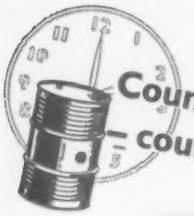
SAFER...
The enclosed cutting blade locked in the body of the cutter assures perfect safety.

and it's

PORTABLE...
Models for tool kit or stationary operation. With cutting capacities up to: 1 inch, 1-1/16 inch, 1½ inch.

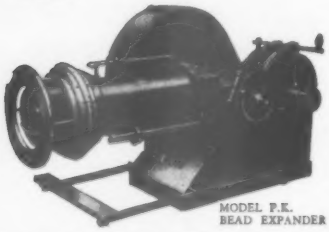
SEE YOUR DEALER OR WRITE DEPT. "M"

Morse-Starrett Products Company
1204 - 49TH AVENUE, OAKLAND 1, CALIF.



Count the minutes
count the Drums!

MODEL V.P. DOUBLE CRANK PRESS



MODEL P.E. BEAD EXPANDER

From the sheet to the finished container involves as little as eleven operations; illustrated are two of the machines required—for forming ends and expanding beads. If you wish to speed up your output choose MOON machines—the complete plant averages a drum a minute.

MOON

Regd Trade Mark

LONDON OFFICE: Abbey House, 2/8 Victoria Street, Westminster, London, S.W.1, England. Cables: Moonbro, Sowest, London, England.

MOON BROTHERS LIMITED, BEAUFORT ROAD, BIRKENHEAD, ENGLAND
Cables: "Moonbro", Birkenhead, England

AGENTS IN U.S.A.: M. Neumunz & Son Incorporated, 90 West Street, New York 6, New York
AGENTS IN CANADA: Dominion Welders & Machinery Ltd., 322 Lumsden Avenue, Toronto 13

MAKERS OF TIN BOX AND DRUM MAKING MACHINERY

dm MB 47

Timely Topics in Current Issue

PETROLEUM OUTLOOK

- OIL OUTLOOK BRIGHTENS
- MAP OF OIL LANDS OF NORTHERN PACIFIC RAILWAY
- COST OF FINDING OIL CLIMBS
- 1952 NET INCOME—53 COMPANIES
- MAJOR OIL FIELD SHAPING UP IN SASKATCHEWAN?

These are some of the topics covered in the April "PETROLEUM OUTLOOK"—the fast-growing, authoritative monthly service that is widely read by top-flight oil men, investors and financial firms throughout the U. S. Saves time, reading, research. Subscribe now on trial basis. Only $10 for six months; money back if not completely satisfied.

JOHN S. HEROLD, INC. • *Geologists*
DEPT. OG-1. 250 PARK AVE., NEW YORK 17, N. Y.

Please send PETROLEUM OUTLOOK for 6 months

Name.....
Company.....
Street.....
City.....State.....
☐ Enclosed is check for $10 ☐ Please bill me

tion is found in Phosphoria lime. The operator recovered hard, tight, bleeding core from the interval 7,088-7,160 ft. and has landed casing at 7,080 ft., and will acidize and test the open hole to 7,188 ft., total depth. On the basis of comparison with the producing formation as found in other wells in the area the will is expected to flow following treatment, and no drill-stem tests have been run.

Three Units to Get First Tests

Initial tests of three Wyoming units are currently scheduled. Stanolind Oil & Gas Co. has made location for the first test of the Dickie Unit, Fremont County, at NE SW NW 25-45n-101w. This wildcat will test to Madison at about 7,000 ft. and is about 12 miles west of Grass Creek pool.

Another Fremont County unit will be drilled by Atlantic Refining Co. The company staked location on the Northwest Muskrat unit in SE SE SE 18-34n-92w, and will test Phosphoria and Tensleep. The location is about 5 miles northwest of Muskrat field which has gas production from Frontier sands.

In Carbon County, Continental Oil Co. has located the initial wildcat on the Miller Hill unit, also a recently approved agreement. The well will be in NE NE NE 20-18n-88w, and will be a Tensleep test, projected to about 2,750 ft.

Two Important Montana Wildcats Drill Ahead

Shell Oil is coring ahead below 8,560 ft. at Unit 22-33, NW SE NW 33-10n-58e in the Cabin Creek area of Fallon County, with no new tests reported in current operations. The wildcat has already established a section of about 400 ft. considered productive in Mississippian and a 130-ft. productive section in Devonian (?) and is considered by some observers one of the most promising discoveries in the entire basin.

North of the Cabin Creek area, Phillips Petroleum and Sun Oil Co. are drilling below 12,568 ft. in 1 Dynneson, C SW NE 32-24n-58e, Richland County. The wildcat has established a new drilling depth record for the state, It had shows in Mississippian formation at about 9,000 ft. but has not conclusively tested the zone.

SOUTH DAKOTA

Kerr-McGee Locates First Operations in South Dakota

Kerr-McGee Oil Industries has located for two South Dakota wildcats which will be the first drilling in the state for the firm which has had land holdings through the area for a considerable time. The company is moving in tools at 1 Chute, C SW SW 33-3n-19e, in Haakon County, and has made location for 1 Cook, SW NW SW 13n-22e, in Dewey County.

NORTH DAKOTA

New McKenzie County Wildcat Staked

Stanolind Oil & Gas Co. has made location for 1 Star, C SW SE 21-152n-94w, in the West Sanish area of McKenzie County. The wildcat is on a seismic prospect in one of the most interesting areas of the basin.

It will be drilled to about 12,000 ft. to evaluate a portion of a 17,290-acre block for which the operator paid a bonus of $37.00 per acre at a Fort Berthold Indian Agency sale about a year ago. It is 12 miles east of the discovery of Pacific Western Oil Co. and Amerada Petroleum Corp. at 1 Wollan, C NW NW 15-152n-96w.

TEXAS

TEXAS GULF COAST

Caplan Gets Deeper Pay

The Caplan field, on Bolivar Penninsula, Galveston County, has been given a new pay zone with the completion by Sun Oil Co. of its 9 Zinn & Forman, located in the S. F. Hughes Survey, just north of State Highway 87. The pay, open at 7,771-78 ft., is the deepest yet found in the area. The well flowed 203 bbl. of 36.8°-gravity oil in 24 hours through 8/64-in. choke.

New Gas Distillate Field Indicated for Victoria

Discovery of another Wilcox gas-condensate field is indicated in Victoria County by results of two drill-stem tests made by Arnold O. Morgan at his 1 R. H. Welder. Location is in the SA & MG Survey, approximately 4 miles northeast of Nursery, and about 4½ miles southwest of production of the Helen Gohlke field, on the Victoria-DeWitt county line.

Latest drill-stem test was of an interval at 8,580-95 ft. in the first Wilcox sand. With tester open through ¾-in. and ¼-in. chokes, the well had gas at the surface in 1 minute, and flowed gas and distillate with top working pressure of 1,700 psi.

Previous test was slightly higher in the pay at 8,582-90 ft., getting gas to the top in 2 minutes and flowing gas and distillate with working pressure of 1,510 psi. and bottomhole pressure (flowing) of 2,400 psi. Recovery was 500 ft. of distillate-cut water cushion and 20 ft. of clean distillate.

WEST TEXAS

Pre-Permian Discoveries, Extensions, Indicated

Andrews and Upton counties had new discoveries in the making and significant extensions to proved areas in testing and completion stages.

A possible new Ellenburger structure for northeast Andrews County was seen at Phillips Petroleum Co. 1-R University, located northeast of the same firm's 1-CC University, a Devonian discovery, and about 3 miles north of Ellenburger production in the Magutex field.

Top of the Ellenburger at 13,848 ft. on elevation of 3,051 ft., was nearly flat with the Magutex field. Operators drilled to 13,853 ft., then with packer at 13,805 ft., drill-stem tested, using 5,329 ft. of water blanket. Oil flowed in 3 hours and 45 minutes, and on the last 16 hours of the test, gaged 174 bbl. of clean oil through ⅜-in. top choke. Bottomhole flowing pressure ranged from 2,640-3,840 psi.

The well also indicated production from the Devonian, and that section was to be tested before completion. Top of the Devonian was 12,450 ft., minus 9,399 ft., and

Write or Wire
for Monthly Stock Lists

● VALVES
● PRESSURE TUBING
● STEEL

Peerless Supply Co., Inc.
L. D. 75 & 76 P. O. Drawer 36-A
Shreveport, La.

EMPIRE
SAND SAMPLE
ENVELOPES

Especially designed and manufactured for storing sand samples. They will last and serve for years. Immediate delivery of any quantity. Prices and samples on request.

32# KRAFT
RUSTPROOF
FLEXIBLE
METAL TIE

CORE BOXES

Corrugated boxes for storing Empire Sand Sample Envelopes manufactured to fit your specifications. Inquiries for any size and quantity solicited.

TULSA PAPER CO.
P. O. BOX 30 TULSA 1, OKLA.

"One of the outstanding geological publications of recent years. Its writings must have been possible only as the result of a prodigious amount of hard, time-consuming work, the highest level of technical knowledge of geology, remarkable ability to evaluate a voluminous geological literature, and a high level of skill as a writer. . . . Every geologist who can do so should avail himself of this excellent refresher and reference book."—A.A.P.G. Bulletin.

STRUCTURAL GEOLOGY
OF NORTH AMERICA
By A. J. EARDLEY

This monumental volume provides the first detailed description of the structural evolution of an entire continent: formation and constitution of MT systems, basins, arches, and volcanic archipelagos, leveling of highlands, filling of basins. Double-column pages, 11¼"x8¼", provide the equivalent of two ordinary volumes, and permit large maps and other drawings. Some 750 illustrations and 16 paleotectonic maps in full color.

620 pages $12.50

READER SERVICE DEPARTMENT
P. O. BOX 1260 TULSA 1, OKLA.

OIL FINANCING

Our technical and financial knowledge of the oil industry is available to principals of independently or family owned oil and gas properties. If you are contemplating a loan against present production or considering the acquisition or sale of producing holdings, our specialized experience may be helpful.

C. LESLIE RICE, JR.
Vice President

J. F. DOUGHERTY
Vice President

Oil Department

Empire Trust Company
7 WEST 51st STREET
at Rockefeller Center, New York, N. Y.

drill-stem test at 12,460-600 ft. recovered oil-cut water blanket plus 7,480 ft. of oil.

Devonian extension... In southwest Andrews County, Gulf Oil Corp. 1-AU State extended the Block 11-Devonian field to the south, flowing 309 bbl. of oil a day. Completion gage was through ½-in. choke from pay section at 8,213-40 ft.

Upton County prospect... A Fusselman discovery east of the Wilshire-Ellenburger field was in prospect at The Texas Co. 1 Graf, located in the west-central part of the county.

Top of the Fusselman was 11,655 ft., minus 8,835 ft., and first test from 11,641-712 ft. had gas at the rate of 3,500,000 cu. ft. and recovered 110 ft. of 52° oil. Second test from 11,712-50 ft. had gas in 3 minutes, at a lesser rate, and recovered 280 ft. of 49° oil. Operators were drilling ahead below 11,828 ft.

McElroy Ranch extension... Gulf 362-McElroy, 1-mile west extension attempt, and confirmation well to Gulf 1-N, original Devonian discovery east of the McElroy-Permian field, had oil on drill-stem tests of the Devonian.

Top of the formation was 9,840 ft., minus 7,236 ft., which was low to that marker in the first well. Tests at 10,170-223 ft. developed gas-cut mud, and at 10,323-408 ft., recovery included 840 ft. of clean oil. From 10,408-68 ft., recovery was gas-cut mud and some salt water. Last test reported, from 10,665-720 ft., had gas in 12 minutes and recovered 1,410 ft. of clean oil, plus 150 ft. of oil and mud, with no water. Operators cored additional oil shows to 10,734 ft., and continued coring.

Active Rigs Up

A count of active rotary rigs in West Texas fields, Texas Railroad Commission Districts 7-C and 8, shows a 17 per cent gain at the end of March, on a monthly basis. This represents a steady increase since the low point around the first of the year.

The drop in drilling wells for West Texas is accounted for mostly by reduced activity in the Spraberry Trend fields. Except for that phase, the picture of drilling and exploration is looking up. Wildcat drilling is holding steady, and is comparable to the same period a year ago, but depths on exploratory holes are steadily increasing.

The combination of deeper holes, with greatly increased costs, would normally dictate fewer wells drilled, but results over the first quarter of this year have been good, and prospects for an expansion of deep drilling programs are in evidence.

TEXAS PANHANDLE

Hugoton Flank Test Staked

A deep wildcat test has been staked off the east flank of the vast Hugoton gas field in Hansford County, in the northern portion of the Texas Panhandle. The new wildcat will be of considerable importance to exploratory work along the flanks of the Hugoton area where most success has been in the Oklahoma Panhandle and southwestern Kansas areas.

The new test is Humble Oil & Refining Co. 1 H. J. Collier, 2,640 ft. from north and west lines, Section 41, Block 1, WC Survey, 13 miles northeast of the town of Gruver and 2¼ miles southeast of Hugoton field gas production.

Development in Roberts County's Quinduno field, the Panhandle's most active development area, continues to be outstanding. Seven new producers for the field are apparent by drill-stem and production tests. Operators have staked three new locations in the field, also.

SOUTHWEST TEXAS

New Gas Field Opened At South Tip of Texas

Completion by Texas Gulf Producing Co. of a gas well at its 1 Garcia, a wildcat located 8 miles west of Port Isabel, in Cameron County, at the south tip of Texas, opens Texas' most southerly field. Pay zone, open through casing perforations at 7,315-25 ft., is reported in the Miocene, which would make this the first production of that age in that general part of the state.

The well currently is shut in after production tests in which it flowed at the rate of 2,670,000 cu. ft. of gas per day through ¼-in. choke with pressure of 1,800 psi. on the tubing. The gas showed a trace of distillate. Hole was drilled to 10,537 ft. and plugged back with casing cemented at 8,465 ft.

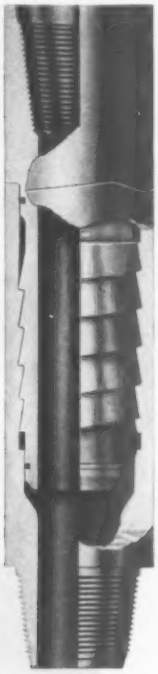
Previous production in Cameron County has been limited to the small Port Isabel gas field, located north of the present discovery, and the Lacy field, located on the west edge of the county, where it extends across the Hidalgo County line.

New Hidalgo Gas Area

Sun Oil Co. has opened a new gas area in southern Hidalgo County with the completion of its 1 J. C. Kelly, in Porcion 66, flowing at

THE BOWEN SAFETY JOINT

The safest joint in the string—yet positively releases in emergency



Releases
Re-engages
Locks
Packs-off

BOWEN SAFETY JOINTS give you these four important safety tool advantages for drilling, testing and fishing operations.

To RELEASE A BOWEN SAFETY JOINT in the hole you need only rotate the drill string slightly to the left and lower until the joint breaks. Then unscrew the two sections.

To RE-ENGAGE a BOWEN SAFETY JOINT you simply locate the top of the box section and, applying not more than one point of weight, rotate to the right until an increase in torque indicates that the safety joint is re-engaged.

For DRILLING, TESTING, OR FISHING a BOWEN SAFETY JOINT can be rotated in either direction. It will withstand greater tensile or torsional strain than the drill string.

BOWEN SAFETY JOINTS fit right into your present string as a regular sub with no out-of-size dimensions. They have the same outside diameter and fluid passage as its corresponding size tool joints, and BOWEN SAFETY JOINTS are dependable on the toughest drilling, testing and fishing operations.

Write for descriptive literature

SR BOWEN CO

MAIN OFFICE AND PLANT
1106 SOUTH NORWALK BOULEVARD
SANTA FE SPRINGS, CALIFORNIA
EXPORT OFFICE
30 ROCKEFELLER PLAZA
NEW YORK CITY, NEW YORK

the rate of 21,500,000 cu. ft. of gas per day from casing perforations at 6,336-52 ft. Location is 7½ miles south of McAllen.

MICHIGAN

Ottawa Discovery Finaled In Traverse Lime

The Allied Investments, Inc. 1 Nixon, NW SE SE 9-8n-14w, Polkton Township wildcat, Ottawa County, was completed in the Traverse lime at 1,895 ft., total depth, and produced an average of 40 bbl. of oil a day on initial tests after acid treatment with 1,000 gal.

Well was estimated to be good for about 25 bbl. of oil daily on a more settled basis. The 1 Nixon, which is being rated by some as a new discovery, and by others as an extender of the older Polkton pool, logged top of Traverse lime at 1,891 ft. and pay started to show at 1,891 ft. Well carried about 450 ft. of clean oil, with a good gas head in evidence after being shut in for about a week after pay was tapped. No water was in evidence after the acid treatment.

The older Polkton Traverse oil pool, which was discovered in 1942, centers around Sections 11, 14, and 15, Polkton Township. This original field, to the end of 1951, last year for which data is compiled, covered 60 drilled acres with a total average recovery to that date of 337 bbl. per acre. The new well was reported to be structurally higher than the wells in the original development. Allied Investments, Inc., drilled this, with the cooperation of Carter Oil Co., on a 600 to 700-acre drilling block. Carter controls a good spread of acreage in the play including several offsets.

A new Berea (Ellsworth dolomite) gas discovery well was completed in Ravenna Township, Muskegon County, at the Max Spidel 1 Kubik & Bolt, NE NE SW 27-9n-14w. Well was completed in the Berea at 1,190 ft., total depth, and rated good for an estimated 2,000,000 cu. ft. of gas a day. Bottom-hole pressure was reported at 510 psi., slightly lower than the original pressures recorded for the first Ravenna Berea gas pool, discovered in 1936, and situated in the northwestern corner of Ravenna Township.

APPALACHIAN AREA

WEST VIRGINIA

In Anthony Creek district, Greenbrier County, a wildcat test resulted in a dry hole. The unsuccessful test was Natural Resources Corp. 1-1 J. M. Van Buren heirs. Good gas wells were noted in the Harvey district, Mingo County, and Pocatalico district, Putnam County. United Fuel Gas Co. 6984 Fee, completed with a gage of 3,633 M.c.f. of gas per day from the Big lime, while Godfrey L. Cabot, Inc., 5-1397 resulted in 2,157 M.c.f. of gas in the Oriskany sand.

OHIO

James I. Shearer et al moved 2,000 ft. east for a second test on Charles Fox, 2nd Qr., Bethlehem Township, Coshocton County. Clinton sand was reported at 3,400-460 ft. with a show of oil natural and 36 bbl. in 24 hours after a 110-qt. shot. This is the fourth well drilled in the area, all of which have made small producers.

In Mt. Zion pool, Mutual Oil & Gas Co. 6 Wheeler Johnson, Section 24, Jackson Township, Knox County, logged the Clinton at 2,835-86 ft. with a good show of oil nat-

From Well to Warehouse... Your Best Building Value is BUTLER!

This Butler building, 16' x 20' x 10', houses loading pumps.

You can build to match the job when you specify a Butler building. Three basic types let you specify the most economical construction for each building purpose. Each type has a wide range of adaptability in width, length, height, wall covering and interior finish. Each is pre-engineered to include features developed from *more than 40 years* of Butler experience in designing buildings for the oil industry. *Look at these BUTLER values:*

- Aluminum or galvanized covering
- Clear spans from 4 to 70 feet in single units; multiples to any width
- Erected in hours or days instead of weeks
- Bolted construction for greatest strength; yet easily disassembled for moving
- Lightweight for easy trucking to or from off-highway locations
- Maximum wind resistance and firesafety
- Sealed against rain, snow, dust
- Appearance that's a credit to any installation

Notice the clear, unobstructed interior of this 40' x 120' rigid frame Butler building used as a supply warehouse, Tulsa, Oklahoma.

Butler buildings serve the oil industry • Rig Houses • Pump Houses • Engine Houses Tool Houses • Machine Shops • Field Offices • Pumping Stations • Power Stations Gathering Plants • Flowing Plants • Supply Depots • Material Depots Warehouses • Garages • Meter Houses

Straight Sidewalls . . . Get More Space Per Dollar

KANSAS CITY, MO.
Birmingham, Ala. — Richmond, Calif.
Galesburg, Ill. — Minneapolis, Minn.

BUTLER STEEL PRODUCTS

OIL EQUIPMENT — STEEL BUILDINGS
FARM EQUIPMENT—CLEANERS EQUIPMENT
SPECIAL PRODUCTS

For prompt reply, address office nearest you:
BUTLER MANUFACTURING COMPANY
7464 East 13th St., Kansas City 26, Mo.
964 Sixth Ave., S. E., Minneapolis 14, Minn.
Dept. 64, Richmond, Calif.

Please send me free information about Butler buildings for use as .....
Name .....
Address .....
City ..... Zone ..... State .....

ural and 83 bbl. in 24 hours after shot.

Ohio Fuel Co. brought in a nice gasser on Charles Blue, Section 19, Butler Township, Knox County. Clinton sand at 3,032-3,085 ft. gaged 2,630,000 cu. ft. natural from pay at 3,076-84 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Aransas County: *T. F. Murchison et al 1 Nana Holden, Block 93, Fulton Townsite. IP 196 BOPD, 10/64-in., 41.4°, casing perforations 7,162½-58½ ft. TD 7,290 ft. (new pay in East Fulton Beach field.)

*Sun Oil Co. 6-74 Copana Bay-State, Tract 74, Copana Bay. IP 107 BOPD, 9/64-in., 42.6°, casing perforations 7,143-48 ft. TD 7,190 ft. (New pay in Fulton Beach field.)

* Sun Oil Co. 104-3 Copana-State, Tract 104, Copana Bay. IP 150.18 BOPD, 9/64-in., 42.5°, casing perforations 7,752-58 ft. TD 9,102 ft. (New pay in West Fulton Beach field.)

Atascosa County: R. H. Kiel 1 Birdwell, Block 66, John Neil Survey 1191. Dry. TD 1,513 ft.

Bexar County: *Elliott, Laub & Hill 1 Woods, Jose M. Arocha Survey 15. IPP 4.06 BOPD, 36°, casing perforations 1,416-26 ft. TD 1,449 ft.

Dimmitt County: Howeth & Mason 1 McLaren, William Votaw Survey 9, A-734. Dry. TD 5,065 ft.

Duval County: O. G. McClain et al 1-A Sutherland, SA&MG Survey 7, A-534. Dry. TD 2,919 ft.

Guadalupe County: Coulson Drilling Co. 1 Winona Parchman McQuad, William G. Hunt ⅓ League. Dry. TD 2,490 ft.

Hidalgo County: *Sun Oil Co. 1 Kelly, Porcion 66. IP 21,500 M.c.f. daily, open flow, casing perforations 6,336-52 ft. TD 8,001 ft. (New field—Hidalgo.)

Jim Wells County: Gilcrease Oil Co. 1 Adams, Block 21, Waldron Subdivision, Robert Adams ranch. Dry. TD 5,426 ft.

Starr County: Gaines Oil Co. 1 Ivey, Block 8, Porcion 75, Juan V. Villareal Survey, A-183. Dry. TD 205 ft.

L. S. Harlowe 1 Speer, TTRR Survey 482. Dry. TD 5,538 ft.

Webb County: Harry E. Murray 1-A Grant Adami, J. H. Gibson 338 Survey. Dry. TD 1,650 ft.

Wilson County: H. H. Howell and Great Lakes Carbon Co. 2 Weinert. V. Bennett Survey 25. Dry. 4,427 ft.

Midwest Oil Corp. et al 1 Peebles, Ezekiel Smith Survey, A-471. Dry. TD 4,640 ft.

TEXAS GULF COAST

Brazoria County: H. L. Hunt 1 J. H. Crooker et al, HT&B Sur., A-254. Dry. TD 10,011 ft.

* Colorado County: Shell Oil Co. 2 Ackley, W. L. Platt Sur., A-831. IP 5,500 M.c.f. daily and 203.5 BCPD, ¾-in., casing perforations 10,689-748 ft. and 10,774-99 ft. TD 11,075 ft. (New pay in Sheridan field.)

DeWitt County: Carter & Carter and Carnes W. Weaver 1 Dodzuweit, M. W. Bumstead Sur. Dry. TD 8,017 ft.

Fayette County: James Snowden & Starr Oil & Gas Co. 1 Herman Eichler, Jr., Charles F. Fleasner ⅓ Lge., A-186. Dry. TD 8,045 ft.

* Galveston County: Sun Oil Co. 9 Zinn & Forman, S. F. Hughes Sur. IP 203 BOPD, 8/64-in., 36.8°, casing perforations 7,771-78 ft. TD 7,850 ft. (New pay in Caplan field.)

Grimes County: Brewster & Bartle Drilling Co., Inc., 1 Neville, D. B. McMahan Sur. A-42. Dry. TD 10,505 ft.

Jackson County: King & Heyne and 2nd M. E. Andrews, Ltd., 1 Terrell, W. M. Murphy Sur., A-58. Dry. TD 3,806 ft.

W. P. Taylor et al 1 Glissman, Jerimah Heard Sur., A-28. Dry. TD 7,510 ft.

Jefferson County: John W. Mecom 1 Dishman et al, William McFarland Sur., A-39. Dry. TD 9,338 ft.

Signal Oil & Gas Co. 1 Broussard, John McNabb Sur., A-174. Dry. TD 8,500 ft.

Liberty County: Floyd L. Karsten 1 English, Aaron Cherry Sur., A-10. Dry. TD 10,015 ft.

Orange County: Cron & Gracey 1 Stark, Sec. 16, J. A. Richardson Sur., A-347. Dry. TD 8,141 ft.

Victoria County: Shore Exploration Co. et al 2 O'Connor, McFaddin & Allen Sur., A-493. Dry. TD 2,779 ft.

Wharton County: Texas State Drilling Co. 1 Nilson, ETRR Sur., A-143. Dry. TD 6,455 ft.

EAST TEXAS

Bowie County: W. B. Hinton 1 Julia Hefley, T. T. Martin Sur. Dry. TD 4,403 ft.

Shelby County: Major & Garvin Production Co. Olin Industries, E. E. Cooey Sur., A-143. Dry. TD 8,300 ft.

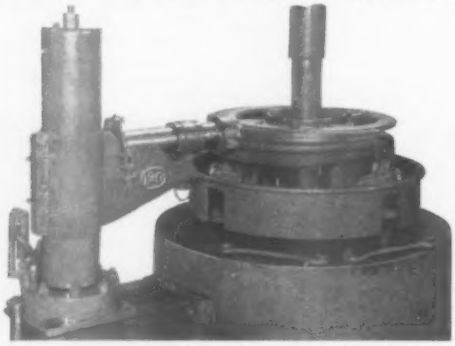
Titus County: J. Z. Werby 1 Bob Sandlin, J. H. Tyler Sur. Dry. TD 4,4100 ft., elev. 324 ft., Woodbine 3,637 ft.

LEGAL

1,120 acres of Tribal Indian lands located on the Uintah and Ouray Indian Reservation, Township 3 South, Range 5 West, Uintah Special Base and Meridian Survey in Duchesne County, State of Utah, are being advertised for oil and gas lease sale, bids on which will be opened 2:00 P.M., April 28, 1953, at the office of Harry W. Gilmore, Superintendent, Uintah and Ouray Agency, Fort Duchesne, Utah. Full particulars may be obtained from the office of the Regional Oil and Gas Supervisor, U. S. Geological Survey, Casper, Wyoming, or from the Uintah and Ouray Agency.

KELCO

WELCOME TO THE
OIL SHOW
AND TO OUR EXHIBIT ON SILVER LANE — BOOTHS 36 & 37



The famous KelCo Air Operated Power Slips will be in operation in our booths. KelCo Spinning Line and Breakout Catheads will be on display on many of the rigs of other exhibitors.
Our phone number at the Oil Show is 6-1776

Representatives in all principal oil fields

Be Safety Wise — KelCo-ize

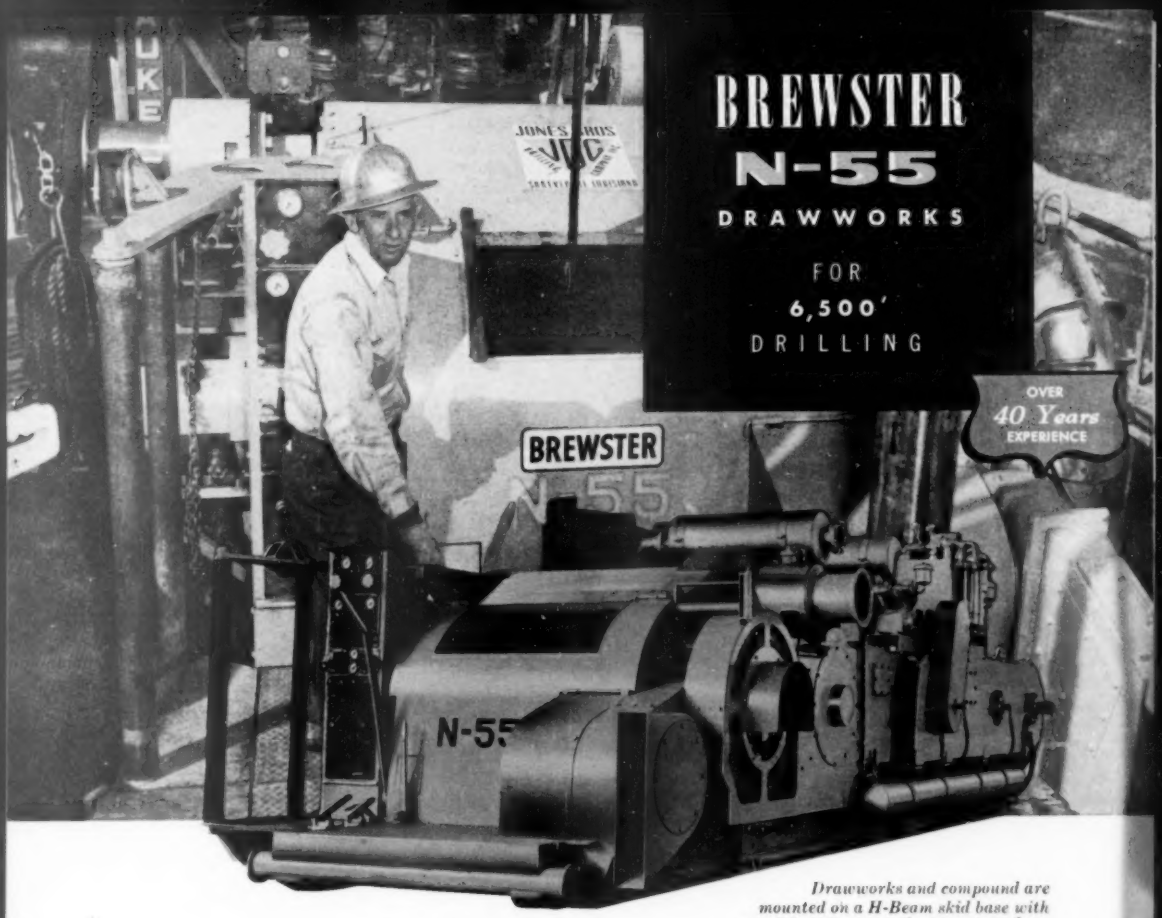
KELCO BEN F. KELLEY CO., Inc.
TULSA, OKLAHOMA

SPINNING LINE CATHEADS • BREAKOUT CATHEADS • AIR OPERATED POWER SLIPS
TUBING TONGS • SAFETY "C" POLISHED ROD CLAMPS

Grinding and Hard-Chrome Plating of Diesel Engine Crankshafts — All Sizes

Complete facilities for grinding, plating, Magnafluxing, and electrically-controlled heat-treating. Largest hard-chrome plating plant in Mid-Continent area.

LANE PLATING WORKS
Experience • Quality • Precision
5322 Bonnie View Road
Box 9115 • FRanklin-1351
DALLAS, TEXAS



BREWSTER N-55 DRAWWORKS FOR 6,500' DRILLING

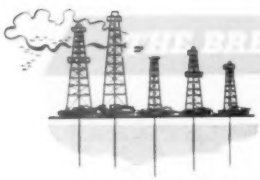
Drawworks and compound are mounted on a H-Beam skid base with provisions for mounting 2 or 3 engines.

A SMALL RIG WITH THE FLEXIBLE POWER OF A BIG RIG — that's what drilling contractors want — that's what Brewster offers them in the N-55. Today, less than two years after its introduction, the N-55 can be found throughout the Southwest, where drilling is around 6500 feet. Its flexible transmission, evenly graduated drum speeds and simple controls make the most economical use of its 500 horsepower. The engineering which has gone into the N-55 is based on Brewster's forty-two years' experience — and the soundness of that design has been proved in thousands of feet of low cost hole.

BIG RIG FEATURES OF THE N-55

500 horsepower transmission — large diameter, extra length drum core—auxiliary positive clutch built into the low drum drive. The only drawworks manufactured for medium drilling which brings you evenly graduated line speeds — 8 forward, 4 reverse, and 4 forward, 2 reverse, rotary speeds.

Let us tell you how the N-55 brings a new economy to medium depth drilling programs.

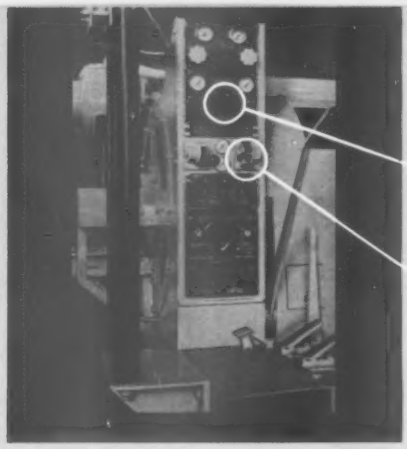


THE BREWSTER COMPANY, INC. SHREVEPORT, LOUISIANA

BREWSTER DRILLING EQUIPMENT

ASK YOUR NEAREST SUPPLY HOUSE TO TELL YOU ABOUT THE N-55 DRAWWORKS

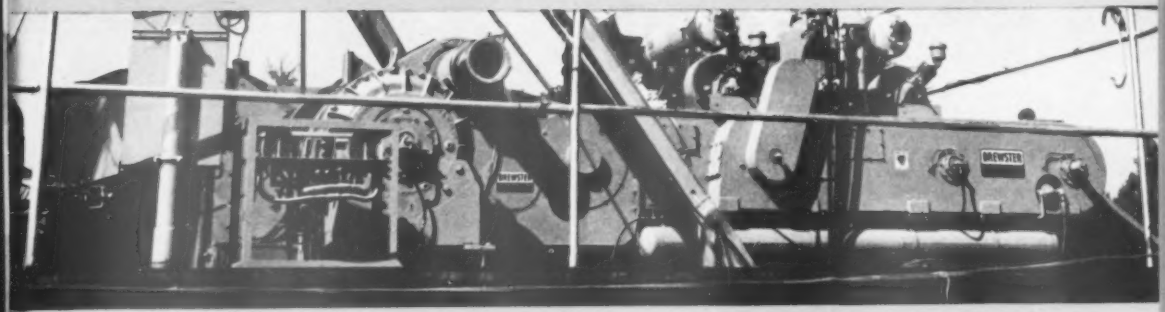
Apex Equipment Company • Murray Brooks, Inc. • Reams Supply Company
Bovaird Supply Company • Industrial Supply Company • In Canada:
Rocky Mountain Supply Company – Direct and through recognized export dealers.



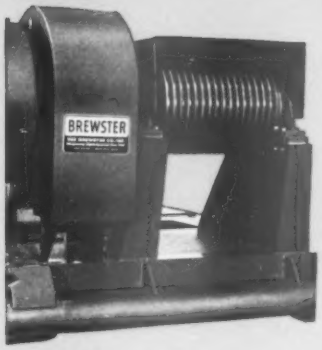
SIMPLE, POSITIVE CONTROLS

TRANSMISSION FRICTION CLUTCH *is controlled by one 4-way valve to give you rapid changes of speed in low and high ranges as well as reverse or full stop. Permits changes when drawworks is in motion and provides safety shutdown in emergency.*

HIGH-LOW DRUM DRIVES, *usually found only on bigger rigs, affords driller 2 to 1 line speed ratio. (This feature is especially desirable for going into hole with drill pipe.)*



Low profile of drawworks and compound gives driller maximum visibility. N-55 compound is same basic design as that of larger Brewster rigs — proven through 15 years of use.



PUMP DRIVES

VEE BELT PUMP DRIVE *is same rugged type as used on larger rigs with drive shaft mounted on two pedestal bearings. Gap mounted Fawick air clutch allows shaft to turn only when driving pump.*

THE BREWSTER COMPANY, INC. Shreveport, Louisiana

SPECIFICATIONS

Transmission Speeds	Lineshaft RPM	Rotary Drive Sprocket RPM 17T-1½"P	Low Speed Drum Drive Line Speeds and Pulls	High Speed Drum Drive Line Speeds and Pulls
LOW	154	195	288'/Min. 43,000 lbs.	987'/Min. 13,000 lbs.
SECOND	207	263	387'/Min. 33,000 lbs.	1,326'/Min. 10,000 lbs.
THIRD	314	399	588'/Min. 22,000 lbs.	2,090'/Min. 7,000 lbs.
HIGH	422	537	791'/Min. 16,000 lbs.	2,710'/Min. 5,000 lbs.

AUXILIARY EQUIPMENT — *RSH-18 ROTARY • MODEL 4-S OILBATH SWIVEL • H-120 HOOK BLOCK*

WILDCAT COMPLETIONS

WEST CENTRAL TEXAS

Brown County: E. L. Dunn et al 1 R. E. George, Blk. 11, A. White Sur. 161. Dry TD 1,585 ft.

L. A. McDonald 1 J. M. Kyzer, Sec. 43, HT&B. Dry. TD 1,560 ft.

Trans-Texas Exploration Co. and E. M. Howard 1 Vanderveer, ETRR Sur., A-3 and Wm. English Sur. Dry. TD 1,244 ft.

*Worth Thomason 1 T. H. Marr, E. L. Betts Sur. 637. IPP 45 BOPD, pay 1,046 ft. TD 1,059 ft.

Callahan County: Hill & Hill 1 Chas. Yost, Sec. 367, G. W. Denton Sur. 367. Dry. TD 4,005 ft., elev. 1,987 ft., Caddo 3,978 ft.

Coleman County: J. H. Blackwell 3 L. S. West, Sec. 701, J. H. Barkley Sur. Dry. TO 2,198 ft.

The Chicago Corp. 1 L. S. West, Sec. 40, BBB&C. Dry. TD 3,137 ft.

Eastland County: R. L. Mashburn 1 Reynolds, 23-1-H&TC. Dry. TD 1,000 ft.

Haskell County: Meredith Drilling Co. 1 C. G. Burson, 34-1-H&TC. Dry. TD 5,360 ft., elev. 1,615 ft., Burson sand 4,774 ft.

Sojourner Drilling Co. 1 S. B. Young, 68-68-A. King Sur. Dry. TD 5,256 ft., elev. 1,545 ft., Caddo 5,197 ft.

Texas Pacific Coal & Oil Co. 1 Avis Lynch, 6-14-H&TC. Dry. TD 5,015 ft.

Jones County: W. E. Butler 1 J. J. Steele, Sec. 334, Harrison CSL. Dry. TD 3,206 ft.

Great Lakes Carbon Corp. 1 W. T. Goree, Sec. 14, D&DA. Dry. TD 2,247 ft.

Joe Josephson and Hack Drilling Co. 1 Dunagin, 16-17-T&P. Dry. TD 5,004 ft., elev. 1,743 ft., Strawn lime 4,906 ft.

Sid Katz 1-A Pittard, Sec. 11, T&NO. Dry. TD 4,671 ft.

Miami Operating Co. 1 J. E. Boaz, J. Wall Sur. 272. Dry. TD 5,385 ft.

*Parker County: F. Kirk Johnson 1 A. E. Wells, Sec. 21, Joseph M. Turner Sur., A-1283. IPP 9.88 BOPD, 41°, limestone pay 3,720 ft., TD 5,450 ft.

Shackelford County: F. Craig Morton 1 Merrick Davis, 29-12-T&P. Dry. TD 5,163 ft., elev. 1,893 ft., Ellenburger 5,110 ft.

Stonewall County: Atlantic Refining Co. 1 Young, Lot 26, Austin & Williams Sur., A-2. Dry. TD 6,250 ft.

*Stephens County: Terrell Petroleum Co. 1-B Link, 24-6-T&P. IP 200 M.c.f., sand 1,990 ft. TD 4,467 ft.

Taylor County: Delta Oil Co. 1 B. G. and Arillia Marshall, 6-3-SPRR. Dry. TD 5,352 ft., Caddo 5,020 ft., Ellenburger 5,242 ft.

Humble Oil & Refining Co. 1 H. Wiley Norwood, 296-64-H&TC. Dry. TD 6,224 ft., elev. 2,439 ft., Caddo 5,600 ft., Ellenburger 5,760 ft., Cambrian sand 6,192 ft.

NORTH TEXAS

Archer County: Joe K. Bailey and Strata Drilling Co. 1 Taylor, Blk. 138, J. H. Harris Sudb. Dry. TD 3,902 ft.

M. W. Blair & Associates 1 R. Campbell, TE&L Sur. 1373. Dry. TD 1,082 ft.

Clay County: L. T. Burns 1 A. Davis, Blk. 71. J. H. Belcher Subd. Dry. TD 4,480 ft.

*A. R. Dillard and G. W. Graham 1 Nolen-Wallace, Blk. 105, Wood CSL, A-705. IP 240 BOPD, 13/64-in., 44°, Caddo 5,710-32 ft. TD 5,732 ft.

Russel Maguire 1 DeKinder, 36-2-Clark & Plumb. Dry. TD 4,613 ft.

Cooke County: Herbert Goodpaster 1 Minnie Reese, R. Trevino Sur., A-1219. Dry. TD 1,800 ft.

R. B. Hollandsworth 1 M. W. Thomason, T. D. Bell Sur., A-52. Dry. TD 2,352 ft.

C. J. Simpson Drilling Co. 1 A. C. Smith, G. Dolley Sur., A-301. Dry. TD 3,831 ft.

Denton County: James Papadakis 3 M. L. Holland, J. C. P. Melton Sur., A-802. Dry. TD 3,000 ft.

Grayson County: Magnolia Petroleum Co. 1 J. F. Godwin, James Coryell Sur., A-261. Dry. TD 12,149 ft.

Montague County: G. E. Kadane & Sons 1 Gist Heirs, John Chambliss Sur., A-123. Dry. TD 1,912 ft.

Wichita County: C. W. and Wm. L. Snoddy 1 J. E. Roller Estate, Blk. 17, C. Larbalestrier Sur. Dry. TD 1,940 ft.

Wise County: Tom B. Medders 1 J. J. Patton, H. M. Cassidy Sur., A-178. Dry. TD 4,810 ft.

Young County: E. C. Brown Trustee 1 L. Stewart, Sec. 229, TE&L. Dry. TD 3,709 ft.

Ted A. Norwood 1 M. K. Graham, TE&L Sur. 2395. Dry. TD 3,036 ft.

Star Oil Co. 1 F. R. Cotton, 3-A366-SPRR. Dry. TD 2,515 ft.

Timberlake, Kelleher and Scott 1 Spearman-Bama, Wm. Stoneham Sur., A-250. Dry. TD 3,663 ft.

WEST TEXAS

*Andrews County: Stanolind Oil & Gas Co. 13-Q Midland Farms, 9-42-T1N-G&M-MB&A. IP 423 BOPD, 16/64-in., 52°, Ellenburger 12,606 ft., TD 12,770 ft. Extension.

Borden County: Robinson Drilling Co. 1 Louis B. Conrad, 79-20-Lavaca Navigation Sur. Dry. TD 4,327 ft.

Crockett County: Neville G. Penrose 1 Texu, Blk. 42, University Lands Sur. 23. Dry. TD 1,616 ft.

*Texas Gulf Producing Co. 1 J. Texas University, 4-50-University. IP 7 BOPD,

AVOID COSTLY SHUT-DOWNS!

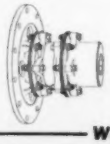
DISTINCTIVE ADVANTAGES of THOMAS ALL-METAL COUPLINGS	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

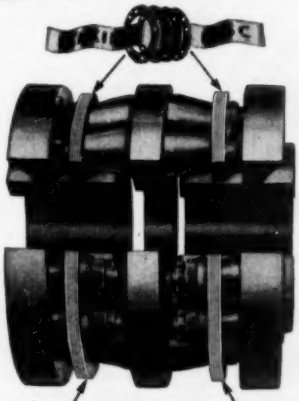
Specify THOMAS Flexible Couplings for Power Transmission

REFINERS! PIPE LINE MEN! DRILLING ENGINEERS! LABORATORY TECHNICIANS!

You can use Thomas Couplings to your advantage on Pumps, Compressors, Cooling Towers, Rigs or any other tough job where continuous operation and dependability are required.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.





Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING COMPANY

WARREN, PENNSYLVANIA, U.S.A.

WILDCAT COMPLETIONS

¼-in., 30°, pay 2,236 ft., TD 2,500 ft.

*Texas Gulf 1-K University, 28-46-University. IP 434 BOPD, ½-in., 41°, Ellenburger 7,271-7,331 ft., TD 7,335 ft. Elkhorn extension.

Dawson County: Woodward Co. 1 E. C. Mahaney, 27-34-T4N-T&P. Dry. TD 9,490 ft., elev. 2,863 ft., reef 9,337 ft.

Garza County: Fred W. Shield 1 George Beggs, 122-5-H&GN. Dry. TD 3,220 ft.

King County: C. L. Norsworthy, Jr. 1 Pitchfork Land & Cattle Co., Sec. 2, MEP&P. Dry. TD 5,222 ft.

Mitchell County: I. Weiner and G. H. Hayward 1 Solomans, 73-97-H&TC. Dry. TD 3,235 ft.

Reeves County: W. F. Stricklin 1 Stricklin-State, 15-45-PSL. Dry. TD 2,880 ft.

Runnels County: W. D. Frazell 1 O. C. McWilliams, George Hall Sur. 323. Dry. TD 4,061 ft.

Inca Drilling Co. 1 K. P. Dunn, T. J. Hardeman Sur. 267. Dry. TD 4,280 ft., elev. 1,925 ft., Gardner 4,214 ft.

*Lee Bros. 1 Homer C. Daniel, J. A. Yeary Sur. 273. IP 321 BOPD, 20/64-in., 42°, Crosscut sand 4,276-88 ft. TD 4,321 ft.

Tom Green County: B. F. Jones and Kenneth Lyons 1 Mrs. Ann Sharp, Sec. 1195, HE&WT. Dry. TD 403 ft.

*Yoakum County: Dunigan Bros. 1 N. E. Dupress, 424-D-J. H. Gibson Sur. IPP 12 BOPD, 33°, pay 5,338-67 ft. TD 5,367 ft.

SOUTHEAST NEW MEXICO

Chaves County: Kewanee Oil Co. 1 DeKalb Federal, 25-11s-26e. Dry. TD 6,278 ft., elev. 3,678 ft., Pennsylvanian 5,164 ft., Devonian 6,058 ft., Ellenburger 6,250 ft.

Eddy County: Gulf Oil Corp. 1 Federal-General American, 24-17s-29e. Dry. TD 13,314 ft., elev. 3,600 ft., Permo-Pennsylvanian 7,532 ft., Mississippian 11,324 ft., Devonian 12,050 ft., Ellenburger 13,140 ft.

U. S. Smelting 9-1 Kelly-Federal, 9-23s-23e. Dry. TD 1,008 ft. Water well.

*Lea County: Lawton Oil Corp. 1-L State, 30-16s-36e. IP 168 BOPD, ¼-in., 42°, Pennsylvanian 11,430-64 ft. TD 11,984 ft., elev. 3,949 ft.

Pearson-Sibert Oil Co. 1 Cooper, 15-16s-18e. Dry. TD 5,860 ft.

MICHIGAN

Muskegon County: C. F. Clapsaddle Drilling Co. 1 Gilbert, NE SE SW 26-9n-15w. Dry. TD 1,965 ft. in Traverse.

* Muskegon County: Max Spidel 1 Kubik & Bolt, NE NE SW 27-9n-14w. IP 2,000,000 cu. ft. gas a day from Berea (Ellsworth dolomite). TD 1,190 ft. in Berea.

Oceana County: Turner Petroleum Corp. 1 Usiak, NE NW NW 13-14n-17w. Dry. TD 4,529 ft. in Niagaran.

* Ottawa County: Allied Investments, Inc. 1 Nixon, NW SE SE 9-8n-14w. IPP 40 bbl. oil 1,892-95 ft. TD 1,895 ft. (Either extension of Polkton pool, or new pool discovery.)

Van Buren County: Norman L. Stevens 1 Owens, NW NW NW 27-1s-15w. Dry. TD 1,153 ft. in Traverse.

WEST VIRGINIA

Greenbrier County, Anthony Creek district: Natural Resources Corp. 1-1 J. M. Van Buren heirs. Dry. Chert and Oriskany sand. TD 2,560 ft.

MARYLAND

Garrett County: Eberly & Snee 1 John I. Miller. Dry. Chert and Oriskany sand. TD 4,021 ft.

MISSISSIPPI

*Chickasaw County: Vaughey & Vaughey 1 U.S.A., NW SE SW NW 9-12s-4e. IP 1,060 M.c.f. daily, 36-in., Evans sand (Mississippian-Chester) 2,409-21 ft. (perforations). TD 2,783 ft. Elev. 350 ft., Eutaw 592 ft., Tuscaloosa 890 ft., Mississippian 1,325 ft., Carter zone 1,785 ft., Sanders zone 1,940 ft., Evans zone 2,405 ft., Iowa 2,690 ft. (New field—Coleville.)

Jefferson County: C. H. Wansley 1 Shields, 50-9n-1w. Dry. TD 6,522 ft. Elev. 254 ft., Vicksburg 1,183 ft., Cook Mountain 2,326 ft., Wilcox 3,813 ft., base Baker shale 5,619 ft.

Pearl River County: Gulf Refining Co. 1-W U.S.A., C NE NE 8-1s-14w. Dry. TD 14,517 ft. Elev. 323 ft., Wilcox 2,863 ft., chalk 6,148 ft., Eagle Ford 7,117 ft., lower Tuscaloosa 8,239 ft., lower Cretaceous 8,757 ft., Paluxy 11,000 ft., first anhydrite 11,885 ft., Ferry Lake 12,537 ft.

Wilkinson County: Gulf Refining Co. 27 Crosby, near C SW NW 1-3n-1w. Dry. TD 7,281 ft. Elev. 291 ft., Wilcox 5,181 ft., base Baker shale 6,472 ft.

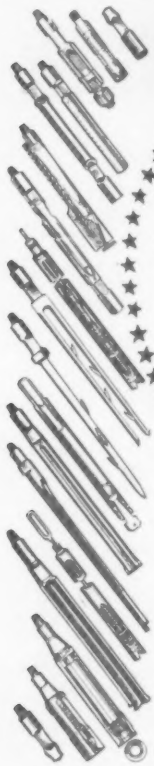
SOUTH LOUISIANA

*Beauregard Parish: Vincent & Welch 2 Long Bell, 35-4s-8w. IP 199 BOPD, 9/64-in., 44.9°, casing perforations 8,010-13 ft. TD 8,610 ft. (New pay in Sweetville field.)

St. Mary Parish: Cities Service Oil Co. 2 State, Lease 1807, offshore from USC & GS Mon "Bayou" station, in Tract 4519. Dry. TD 12,404 ft.

NORTH LOUISIANA

Bienville Parish: Union Producing Co. et al



YOUR U. S. A.

We are off to a new start under a new administration, but the old issue: Socialism vs. Free Enterprise is still around. A mere change of government cannot affect the outcome; the decision rests with the people.

If the proved advantages of competitive enterprise are not further to be curtailed by a creeping state socialism, then every man who loves America and his individual freedom, must speak out to expose the schemes of those who would legislate us to ruin. Without our help, no president, no Congress, however capable, can keep America American.

SPANG WELDLESS JARS

Spang Drilling and Fishing Jars, each made from a single piece of highest-quality alloy steel by drop and hammer forging and then heat-treated for utmost serviceability and safety, have proved their practical advantages for years, in comparison with jars of the welded type.

Spang Weldless Jars are known throughout the world, and are preferred wherever cable-tool drilling is done. While they cost more to buy, they are economical to use because of lower footage cost and less time lost in fishing and replacement. Standard stroke lengths, diameters, and joint sizes are readily available at field stores.

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

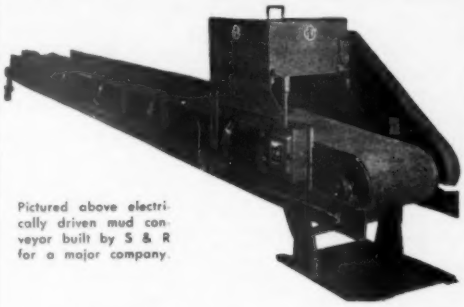
SPANG CABLE TOOLS made by SPANG & CO., BUTLER, PA.

The HIGHER STANDARD

for OIL WELLS · GAS WELLS · ARTESIAN WELLS SHOT BLAST HOLES · PROSPECT DRILLING

SPECIFY SPANG—FOR SALE BY DEALERS EVERYWHERE

S & R SPECIAL *Custom Built*
MUD CONVEYORS FOR DRILLING BARGES



Pictured above electrically driven mud conveyor built by S & R for a major company.

Here's the answer to efficient movement of mud for your drilling barge—it's S & R's custom-built, electrically-powered, chain-drive mud conveyor.

Built for heavy duty service with quality materials equipped with reversible belt, troughing idlers, protected easily accessible drive housing. Operates efficiently all positions to 35° off horizontal. Built-in sizes to 40 feet.

Write, wire or phone for additional information

S & R TOOL & SUPPLY CO.
P. O. Box 1755 — 155 McCarty
HOUSTON 1, TEXAS
Export: 42 Broadway, New York 4, N. Y.

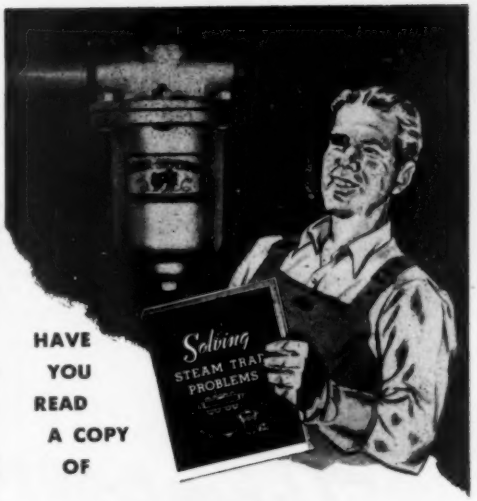
KINZBACH POLISHED ROD STUFFING BOX

POSITIVE SEAL OFF
SELF ALIGNING
SAFE
ECONOMICAL

Kinzbach Polished Rod Stuffing Boxes are plastic packed, have a floating, self-aligning gland and hold positive seals under the toughest conditions. Packing may be added and seal tightened easily without shutting in the well. Available in all popular sizes of polished rods.

KINZBACH TOOL CO INC

KINZBACH TOOL CO., INC.
P. O. BOX 277 — HOUSTON, TEXAS
Export Office: 74 Trinity Place, New York, N. Y.



"Solving Steam Trap Problems"
THE MAINTENANCE MANS' ENCYCLOPEDIA

When maintenance men have a steam trapping problem, they know they can find the answer in Anderson's booklet, "Solving Steam Trap Problems". This wonderful reference book contains valuable formulas, direct reading charts and helpful tables and graphs. It tells you how to simplify piping, cut down on the number of fittings and how to save on trap installation time. In addition, you will find condensation rate charts, graphs and tables. Save time and trouble—familiarize yourself with this invaluable book. Send the coupon for your free copy now.

IT'S FREE!

This book contains 36-pages of information you need to know about steam traps. Get your copy of this handy volume today.

THE V. D. ANDERSON COMPANY

1981 WEST 96th STREET • CLEVELAND 2, OHIO

Gentlemen: Please send me a copy of the book, "Solving Steam Trap Problems." I understand this does not obligate me in any way.

Name .....
Company .....
Title .....
Address .....
City ..... Zone .... State .....

In Canada: Bawden Industries Ltd., Toronto

WILDCAT COMPLETIONS

1 Allison, 5-15n-5w. Dry. TD 8,300 ft. Hosston 7,610 ft.

Catahoula Parish: Justiss Mears and Serio 1 Sayes, 658 ft. N and 660 ft. W SEc 6-3n-5e. Dry. TD 7,106 ft. base Nebo 5,881 ft.

ARKANSAS

Dallas County: John C. Lafata et al 1 Hillman, C NW NE NE 20-10s-13w. Dry. TD 3,010 ft.

Drew County: Dillinger & Ryburn 1 Hardy, 7-13s-7w. Dry. TD 2,004 ft.

Jackson County: Homer S. Head et al 1 Foushee, 374 ft. S and 515 ft. E NWc NE 28-10n-2w. Dry. TD 1,192 ft. Nacatoch.

Prairie County: Carter Oil Co. 11 Core Hole, 715 ft. S and 42 ft. E of NWc 31-3n-6w. Dry. TD 1,870 ft.

Union County: J. L. Foster and Lawton Oil Co. 1 Patterson, C NW SE SE 19-16s-14w. Dry. TD 4,002 ft.

OKLAHOMA

Bryan County: Willingham 1 Buckman, C SE NE 13-5s-8e. Dry. TD 690 ft. granite.

* Caddo County: Continental Oil Co. 1 Smith, SE NW 32-10n-12w. IPP 30 BOPD, Layton 9,196-9,240 ft., 9,550-98 ft. TD 13,515 ft. (New pool).

Garfield County: Helmerich & Payne, Inc. 1 Stewart, SW NE NE 7-23n-3w. Dry. TD 5,567 ft.

Garvin County: Falcon Seaboard 1 Stewart, NE SW NE 12-3n-1w. Dry. TD 4,971 ft.

Grady County: Dick Wegener Drilling Co. 1 McKenna, SE NW NW 18-3n-5w. Dry. TD 4,717 ft.

Jefferson County: Lamb & Ford Drilling Co. 1 Seay, NW NE NW SE 16-6s-6w. Dry. TD 1,857 ft.

Kay County: Manahan Oil Co. 1 Gartner, NW NW SE 10-28n-1e. Dry. TD 3,735 ft.

Lincoln County: Royse-Kingery 1 Rogers, NE SE SW 34-12n-2e. Dry. TD 6,005 ft.

McCurtain County: Busby 2 Epperson, SE SE NE SE 32-7s-23e. Dry. TD 80 ft.

* Noble County: Barrett, Musgrave and Midwest Oil Co. 1 Steiner, SE SW SW 19-20-1w. IPF 80 BOPD, Skinner 4,737-42 ft. TD 5,035 ft. (New pay at North Orlando pool.)

* Okfuskee County: Barron Kidd 1 Finks, NE SE SW 5-10n-10e. IP 2,700 M.c.f. gas daily, lower Gilcrease 3,014-36 ft. TD 3,450 ft. (New pool).

* Osage County: T. F. Dukes and A. Silberman 4 Osage, NE SW NW 9-22n-8e. IPP 80 BOPD, Arbuckle 2,974-3,007 ft. TD 3,007 ft. (New pay at South Hominy Lake.)

Pawnee County: Bell Petroleum of California, Anchor and B. B. Blair 1 Walker, SE NW NW 9-22n-4e. Dry. TD 4,096 ft.

Payne County: H. R. & J. C. Britton 1 Ramsey, NE NE NW 24-18n-2e. Dry. TD 4,183 ft.

Pontotoc County: Lee Evans 1 Fleming, SE SE NE 10-5n-4e. Dry. TD 2,450 ft.

Evans-Shawver-Hailey 1 Myers, SE NE SW 15-5n-6e. Dry. TD 2,866 ft.

KANSAS

Barber County: O. A. Shaw 1 McReynolds, NW NE SW 29-31s-10w. Dry. TD 5,912 ft.

Barton County: Graybol & Smith 1 Newland, SW SW NE 35-17s-13w. Dry. TD 3,448 ft.

* Harms & Knight 1 Fleske, SW SW NW 3-20s-15w. IPP 19 BOPD, Lansing-Kansas City 4,457-74 ft. TD 3,674 ft. (Opens Fleske pool.)

GMR 1 Fisher, NE NE NE 20-20s-12w. Dry. TD 3,507 ft.

Barton County: G. W. Spear-Cassidy 1 Charles, NW SW SE 23-16s-14w. Dry. TD 3,480 ft.

Butler County: J. H. Wagner 1 King, NW SW NE 28-24s-4e. Dry. TD 2,612 ft.

W. McGinnis-Miller 1 Roblin, SE SE SW 23-24s-4e. Dry. TD 2,952 ft.

Rex & Morris-Adair 1 Lake, NW NE NE 30-27s-7e. Dry. TD 2,741 ft.

Cowley County: McNeish & Gralapp 1 Wheeler, SW SW NW 21-32s-3e. Dry. TD 3,160 ft.

Salina Drilling Co. 1 Metz, SE NE NE 34-34s-5e. Dry. TD 3,653 ft.

Geary County: Continental Oil Co. 1 Germann, SE SE NW 20-13s-8e. Dry. TD 2,953 ft.

Logan County: Cooperative Refining Association-Argo 1 Schaffer "A," C NE NW 13-12s-33w. Dry. TD 4,886 ft.

Marshall County: Kansas Oil Co. 1 Brosa, SW SW SE 16-4s-10e. Dry. TD 1,067 ft. granite 1,065 ft.

Pawnee County: Vickes Exploration, Ltd., 1 Converse, SW NW NE 14-21s-15w. Dry. TD 3,845 ft.

Ansel & Rhodes 1 Armstrong, NW NW SW 29-21s-16w. Dry. TD 4,005 ft.

Pratt County: Musgrove 1 Mowbray, SW SW SW 4-29s-11w. Dry. TD 4,687 ft.

Rice County: Trans-Era 1 Fuller, NW SW SE 23-18s-7w. Dry. TD 3,245 ft.

L. Phillips-Isern 1 Rutledge, SE SE SE 8-21s-10w. Dry. TD 3,473 ft.

Rooks County: Anschutz Drilling Co. 1 Stahl, NW NW NE 11-9s-18w. Dry. TD 3,600 ft.

GMR 1 Hilgers "A," SW SW NE 5-10s-18w. Dry. TD 3,801 ft.

Birmingham & Bartlett 1 Gardner, NE NE NE 32-10s-18w. Dry. TD 3,760 ft.

Stafford County: Petroleum, Inc. 1 Osborne "A," SW SW SE 12-23s-14w. Dry. TD 3,990 ft.

* Westgate-Greenland Oil Co. 1 Radke, NW NW NW 24-23s-14w. IPP 110 BOPD, Lansing-Kansas City 3,688-3,700 ft. TD 4,100 ft. (Opens Radke pool.)

Hilton 1 Koelsch, NE NW SW 19-24s-13w. Dry. TD 4,262 ft.

Sumner County: Empire 1 Nixon, CWL W½ NW 34-30s-1w. Dry. TD 3,967 ft.

Thompson
SHALE SEPARATOR AND SAMPLE MACHINE
PROVED 8 WAYS
1. REMOVES DESTRUCTIVE SHALE AND ABRASIVES FROM MUD
2. GIVES ACCURATE SAMPLES
3. TAKES HEAVIEST MUD FLOW
4. SELF-MOTIVATED
5. EASILY TRANSPORTED
6. EASILY INSTALLED
7. ECONOMICAL TO OPERATE
8. SAVES DRILLING COSTS
MAKE Thompson A PART OF YOUR STANDARD DRILLING EQUIPMENT!
SOLD ONLY THROUGH SUPPLY STORES
Thompson TOOL CO.
IOWA PARK, TEXAS

NEBRASKA

Cheyenne County: Magnolia Petroleum Co. 1 Chaloupka, NW NW SE 12-12n-53w. Dry. TD 5,604 ft. "J" sand 5,513 ft.

Warren Petroleum Corp. 1 Thompson, SW SW NW 17-16n-49w. Dry. TD 4,720 ft. "J" sand 4,700 ft.

NORTH DAKOTA

Foster County: Holbert Drilling Co. 1 Dunbar, C NW NW 13-146n-63w. Dry. TD 3,118 ft. Pre-Cambrian 3,108 ft.

CALIFORNIA

* Kern County: Superior Oil Co. 1 T.O.L., 12-26s-20e, IP BOPD, 16.3°, 2.6 per cent cut, perforations 2,323-2,384 ft. TD 2,538 ft. (¼-mile northwest extension to G-1 pool of Lost Hills field.)

* Tide Water Associated Oil Co., 14-17 Farnsworth, 17-25s-20e. IP 14 BO 12 hours, 27.6°, 75 per cent cut, perforations 2,728-2,768 ft. TD 2,769 ft. (5 miles northwest of Lost Hills field.)

* M J M & M Oil Co. 3 Atlantic-Wible, 23-30s-28e. IP 505 BOPD, 24/64-in. 36.4,° perforations 7,301-7,353 ft. TD 7,354. Deepened from 5,475 ft. Nozu sand 7,304 ft. (Deeper pool discovery in Mountain View field.)

Richfield Oil Corp. 67-32 Shields, 32-29s-29e. Dry. TD 5,375 ft.

Los Angeles County: Signal Oil & Gas Co. 1 Signal-C.M.D., 10-2s-12w. Dry. TD 8,700 ft.

* Orange County: The Texas Co. 1 Travis, 30-3s-8w. IPP 4 BOPD, 13 BPD water, perforations 3,005-3,108 ft. (New field discovery 1 mile northeast of East Richfield.)

Standard Oil Co. 1 Sunny Hills, 21-3s-10w. Dry. TD 7,892 ft.

Superior Oil Co. 1-1 Superior, 28-4s-10w. Dry. TD 7,481 ft.

Surfland Oil Co. 1 Anaheim Sugar, 16-5s-11w. Dry. TD 8,033 ft. Deepened from 3,283 ft.

Santa Barbara County: C. W. Colgrove 12-3 Russell, 3-14n-28w. Dry. TD 1,645 ft.

Ventura County: Standard Oil Co. 81-30 Thorpe, 30-4n-20w. Dry. TD 13,780 ft. M J M & M Oil Co. 1 Foote, 32-3n-21w. Dry. TD 4,738 ft.

MONTANA

Golden Valley County: Zephyr Drilling Co. 1 Government, NE NW NE 20-7n-22e. Dry. TD 2,811 ft. Charles 2,735 ft.

WYOMING

Big Horn County: K. D. Owen 1 Pierson, SE SW NW 6-56n-97w. Dry. TD 6,101 ft. Tensleep 6,085-6,101 ft.

COLORADO

Costilla County: Sunny Valley Oil Co. 1 Blanca-Trinchera Ranch, C NW SW 2-30n-72w. Dry. TD 4,662 ft. Shut down.

Larimer County: The California Co. 1 Meyer, C SE SW 19-8n-68w. Dry. TD 7,352 ft., Pre-Cambrian 7,302 ft.

Mesa County: Sam Kubetz 1 Unfred, C NW NW 3-1n-3w (UPM). Dry. TD 810 ft.

Morgan County: National Associated Petroleum Co. 1 Rigsby, NE NE NE 19-6n-58w. Dry. TD 6,615 ft. "M" sand 6,612 ft.

Washington County: Herndon Drilling Co. 1 Jefferson, SE SW SW 12-3s-52w. Dry. TD 4,627 ft. Cloverly 4,610 ft.

*Weld County: Midwest Oil Corp. 1 Uhl et al, NW NW NW 22-11n-56w. IPP 5½ BOPD, "J" sand 6,116 ft. "J" sand discovery—new field. TD 6,450 ft.

WILDCAT COMPLETIONS

MANITOBA

Dando 32-3, LSD 3, 32-1-25w1. Dry. TD 3,945 ft.

SASKATCHEWAN

* Canada Southern 11-22 Smiley, LSD 11, 22-31-25w3. Capped Viking sand gas well, TD 2,702 ft.

Amurex-Albercan 1-4 Russel, LSD 4, 34-12-25w3. Dry. TD 3,835 ft.

Shell Oil Co. 1 Pangman, LSD 9, 28-8-21w2. Dry. TD 8,604 ft.

ALBERTA

* Imperial-Central-Del Rio 4-35 Camrose, LSD 4, 35-47-20w4. Viking sandstone oil well, TD 3,320 ft.

* Great Plains-N.B.D. 16-9 Flatbush, LSD 16, 9-1w5. Capped gas well in basal quartz, TD 3,909 ft.

R. I. Smith-Barons 1 Crown, LSD 8, 10-13-24w4. Dry. TD 6,001 ft.

Hobart & Associates 1 CPR, LSD 1, 7-44-1w4. Dry. TD 2,101 ft.

Mill City-Great Plains-Socony 1 Aerial, LSD 1, 36-28-19w4. Dry. TD 6,180 ft.

Imperial 1 James Creek, LSD 1, 1-120-16w5. Dry. TD 2,060 ft.

Venus-Sioux-Twin River 1 Lethbridge, LSD 9, 28-10-23w4. Dry. TD 5,426 ft.

Plateau-Chungo-Tartan 1 Cedar, LSD 7, 23-44-10w5. Dry. TD 9,110 ft.

Kroy et al 1 Pipestone Creek, LSD 4, 13-47-24w4. Dry. TD 6,070 ft.

NORTHWEST TERRITORIES

N.W.T. Petroleums 1 Big Island, southwest extremity of Great Slave Lake in unsurveyed territory. Dry. TD 1,357 ft.

For results in coring

call on D&S

"KNOW-HOW"

PLUS Truco DIAMOND BITS

AND D&S CORE BARRELS

Drilling & Service

3031 Elm Street Dallas 1, Texas

OFFICE PHONE: Riverside 6811

NIGHT NUMBERS: Elmhurst 6335, Victor 3708

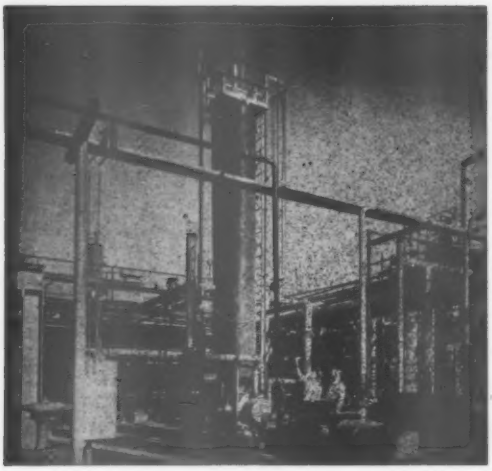
Other Offices-Services: Tyler, Texas — 2-2742; Odessa, Texas — 6-6774; Abilene, Texas — 2-2790; Victoria, Texas — 3264; Norman, Okla. — 4360; Shreveport, La. — 5-5474; Casper, Wyo. — 2-3761; Carmi, Ill. — 7799; Ft. Morgan, Colo. — 1143; Great Bend, Kans. — 7995

Distributor: Allied Services, Inc., Mt. Pleasant, Michigan Telephone: 29-861

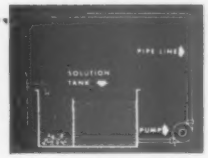
Foreign: D. T. O'Connor, 500 Fifth Avenue, New York, N. Y. Petroleum Industry Consultants, C. A., Caracas, Venez. Denton-Spencer Co., Ltd., Calgary, Alberta, Canada

THE OIL AND GAS JOURNAL

"There she goes—I kept telling you that thing wasn't seaworthy."



Clean towers in-place ... save up to $1000



Working size blueprints of this installation are available. No charge.

HERE'S the blueprint of an Oakite installation that cuts tower cleaning time to as little as 24 hours ... saves up to $1000.

Material? Recommended Oakite detergent solution for speedy, thorough removal of grease, waxes, entrained crudes — sulfides, chlorides, oxides. Solution may be reclaimed and reused.

Method? *In-place* circulation of solution. No dismantling, reaming or sawing. Cleaning crew kept to a minimum ... no outside help needed. Tower quickly restored to full capacity.

Results? Men who use it say: "Never spent 80 bucks so happily to save $1000." "Increased output 400 gallons per hour." "Good results—even trays near top come out clean."

FREE BOOKLET!
This 28-page illustrated booklet contains a wealth of tested techniques for cutting corners on many maintenance cleaning jobs. Send for FREE copy! No obligation.

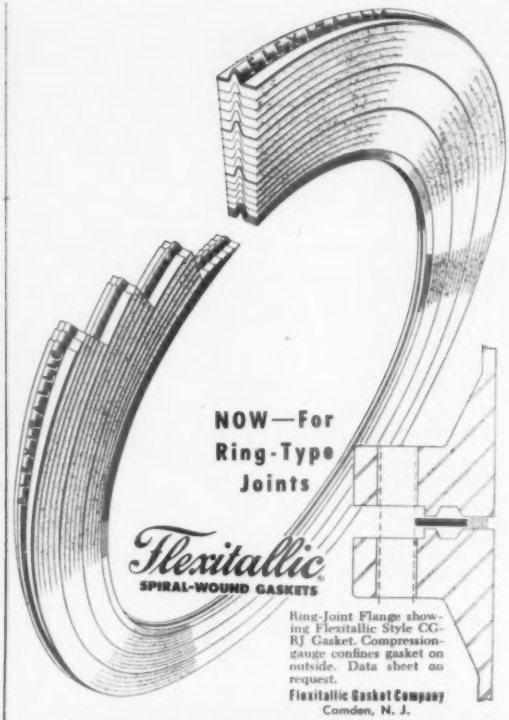
Details absolutely *free*, including blueprints. Write Oakite Products, Inc., 44C Rector St., New York 6, N. Y.

Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE

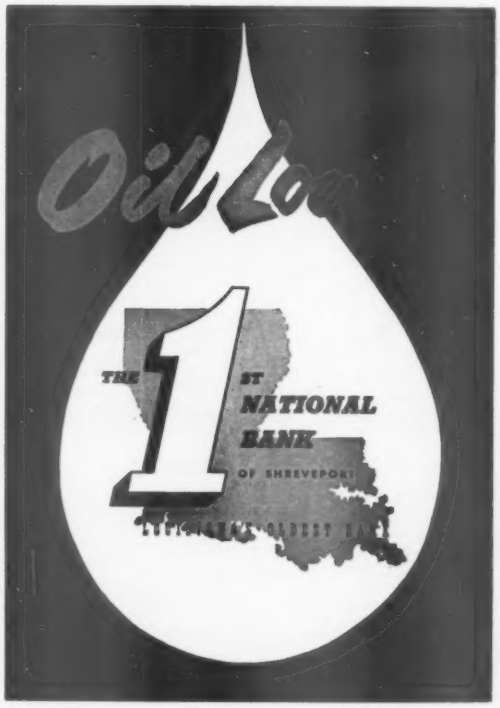
TRADE MARK REG. U. S. PAT. OFF.

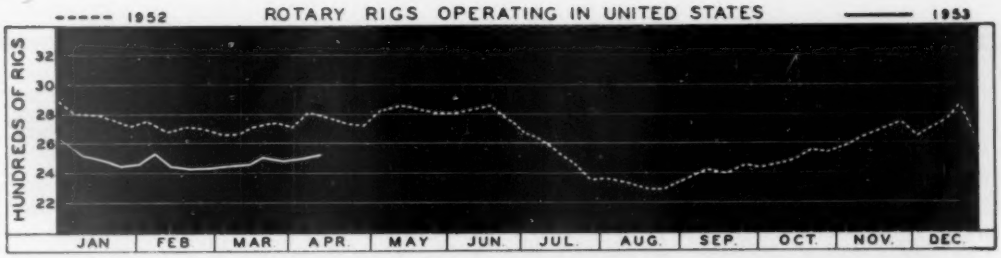
PETROLEUM SERVICE DIVISION

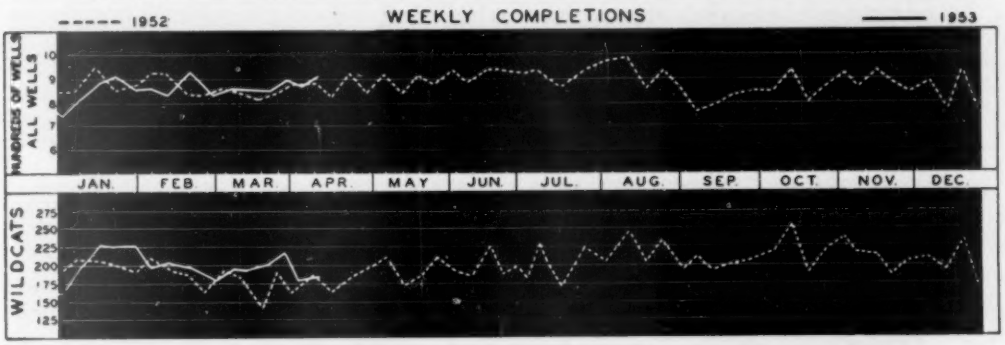


Ring-Joint Flange showing Flexitallic Style CG-RJ Gasket. Compression-gauge confines gasket on outside. Data sheet on request.

Flexitallic Gasket Company
Camden, N. J.







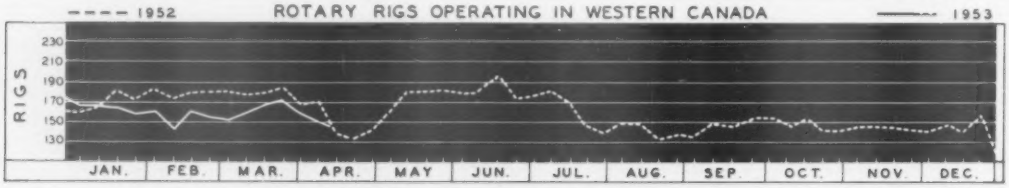
CURRENT STATISTICS

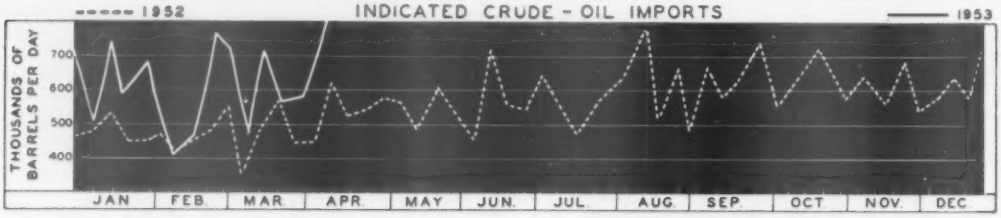
EXPLORATION

WEEKLY WELL COMPLETIONS . . . WEEK ENDED APRIL 11, 1953

	Total of all wells							Wildcat completions and discoveries										
						Apr. 11							Cumulative total, 1953					
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	15	7	0	*8	20,950	186	185	0	0	0	0	0	0	0	0	0	0
Pennsylvania	35	17	3	†15	58,250	461	452	0	0	0	0	0	0	0	3	6	9
West Virginia	7	0	5	2	18,758	143	173	0	0	0	1	1	0	0	2	2	4
Ohio	20	8	3	‡9	38,461	266	251	0	0	0	0	0	1	0	0	8	9
Indiana	16	5	0	11	26,336	321	304	0	0	0	4	4	6	0	1	71	78
Kentucky	20	4	5	11	49,045	283	347	0	0	1	3	4	4	0	0	52	60
Illinois	20	12	0	8	52,526	463	418	0	0	0	2	2	1	0	0	90	91
Michigan	9	3	1	5	22,825	150	171	1	0	1	3	5	7	0	2	58	67
Kansas	110	42	11	57	370,462	1,284	1,335	1	0	0	19	20	29	0	11	204	244
Nebraska	2	0	0	2	10,324	70	66	0	0	0	2	2	5	0	0	31	36
Oklahoma	147	91	5	§51	478,188	1,879	1,700	3	0	1	12	16	26	3	7	170	206
Texas	333	191	16	126	1,503,625	4,561	5,099	13	1	3	73	90	246	20	56	1,127	1,449
North Central (Dist. 7-B & 9)	144	75	2	67	500,307	1,626	1,590	3	0	1	38	42	128	0	6	469	603
West (Dist. 7-C & 8)	78	59	1	18	384,460	996	1,583	5	0	1	10	16	47	2	3	170	222
Panhandle (Dist. 10)	13	11	2	0	41,011	230	195	0	0	0	0	0	0	2	0	7	9
Eastern (Dist. 5 & 6)	10	4	1	5	59,112	219	244	0	0	0	3	3	7	1	1	72	81
Gulf Coast (Dist. 2 & 3)	47	20	7	20	317,960	701	771	1	1	0	12	14	35	5	27	175	242
Southwest (Dist. 1 & 4)	41	22	3	16	200,775	789	716	4	0	1	10	15	29	10	19	234	292
Louisiana	43	23	4	16	328,300	677	629	1	0	0	3	4	18	2	7	93	120
Northern	20	7	4	9	84,380	284	335	0	0	0	2	2	1	0	0	35	36
Southern	23	16	0	7	243,920	393	294	1	0	0	1	2	17	2	7	58	84
Arkansas	13	5	0	8	36,742	130	107	0	0	0	5	5	5	0	0	29	34
Mississippi	7	3	1	3	49,905	96	118	0	0	1	3	4	6	0	2	46	54
Southeastern States	1	1	0	0	6,194	39	16	0	0	0	0	0	1	0	0	30	31
Montana	4	3	0	1	10,922	97	44	0	0	0	1	1	1	0	0	27	28
Wyoming	19	15	1	3	98,124	158	163	0	0	0	1	1	2	0	0	29	31
Colorado	11	3	1	7	49,437	129	107	1	0	0	5	6	4	0	2	73	79
Utah	1	1	0	0	5,726	24	26	0	0	0	0	0	1	0	0	14	15
New Mexico	31	10	15	6	167,288	359	263	1	0	0	4	5	6	0	4	41	51
California	39	30	0	9	173,829	666	724	4	0	0	8	12	19	0	2	153	174
North Dakota	1	0	0	1	3,118	65	5	0	0	0	1	1	0	0	0	13	13
Miscellaneous (Md.)	1	0	0	1	4,021	12	20	0	0	0	1	1	0	0	0	10	10
Total United States	905	474	71	360	3,583,356	12,519	12,723	25	1	7	151	184	388	25	103	2,377	2,893
Total previous week	871	467	70	334	3,445,471			27	1	4	146	178	363	24	96	2,226	2,709
Total April 12, 1952	822	446	49	327	3,433,954			20	2	2	143	167	407	31	66	2,206	2,710

Service wells included: *8, †13, ‡2, §5.

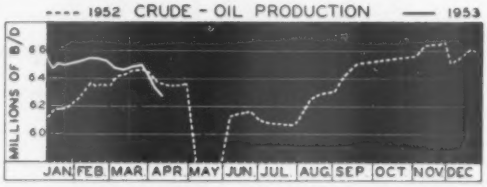


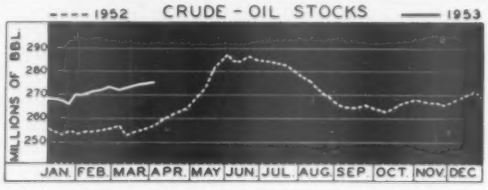


DAILY AVERAGE PRODUCTION FOR WEEK

	April 11			April 4
	Crude oil	Lease condensate	Total	total
Alabama	4,400		4,400	4,400
Arkansas	77,450	700	78,150	77,700
California	999,100		999,100	991,200
Colorado	91,400		91,400	91,200
Eastern	57,100		57,100	57,000
Florida	1,450		1,450	1,450
Illinois	161,200		161,200	163,900
Indiana	35,400		35,400	36,300
Kansas	329,700		329,700	323,700
Kentucky	29,900		29,900	29,600
Louisiana	651,225	41,700	692,925	701,050
North	113,800	2,700	116,500	116,100
South	537,425	39,000	576,425	584,950
Michigan	33,300		33,300	33,200
Mississippi	92,500	4,700	97,200	97,300
Montana	30,000		30,000	32,000
Nebraska	12,700		12,700	12,500
New Mexico	184,725	650	185,375	183,450
Oklahoma	544,900		544,900	541,100
Texas	2,607,975	46,700	2,654,675	2,734,800
Dist. 1	34,275	250	34,525	35,600
Dist. 2	145,300	5,900	151,200	153,950
Dist. 3	436,300	24,000	460,300	470,050
Dist. 4	243,500	5,800	249,300	253,925
Dist. 5	46,500	450	46,950	47,800
Dist. 6	118,725	5,700	124,425	126,150
East Texas field	254,000		254,000	251,000
Dist. 7-B	102,950	75	103,025	103,875
Dist. 7-C	133,500	3,500	137,000	156,000
Dist. 8	857,550	300	857,850	889,475
Dist. 9	163,275	700	163,975	174,575
Dist. 10	72,100	25	72,125	72,400
Utah	4,900		4,900	4,900
Wyoming	208,200		208,200	208,800
North Dakota	14,300		14,300	13,300
Total U. S.	6,171,825	94,450	6,266,275	6,338,850
Change from previous week, down			72,575	
Canada	127,350		127,350	164,900
Total U. S. production, January 1-April 11			654,313,700 bbl.	
Same period last year (crude plus cond.)			*639,688,000 bbl.	

*Includes 9,822,960 bbl. condensate.



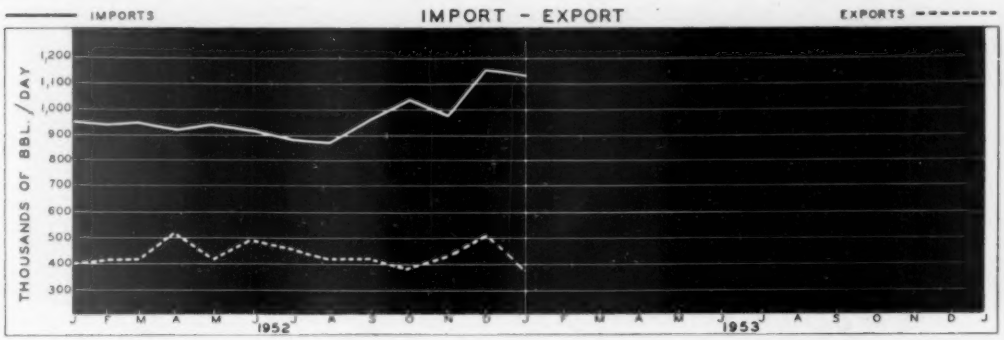


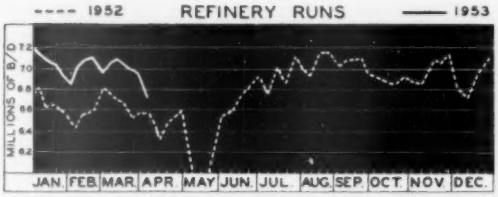
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

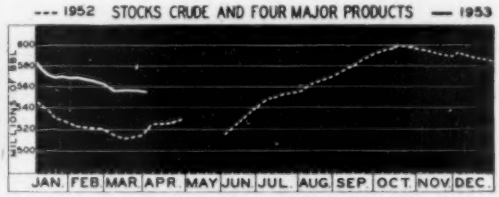
(Thousands of barrels)

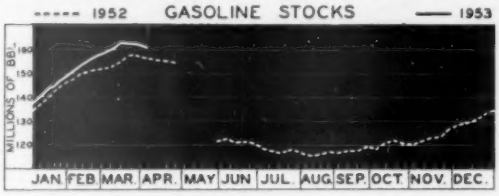
	Apr. 4, '53	Mar. 28, '53	Apr. 5, '52
Pennsylvania Grade	2,472	2,422	2,399
Other Appalachian	1,610	1,867	2,113
Illinois, Indiana, Michigan	10,587	10,494	11,162
Arkansas	2,974	3,083	3,095
Louisiana	17,358	17,288	14,862
North	2,894	3,164	3,054
Gulf	14,464	14,124	11,808
Mississippi	3,915	3,950	3,465
New Mexico	7,067	7,271	7,492
Oklahoma and Kansas	36,735	36,246	39,328
Texas	134,988	135,346	123,738
East Texas proper	11,069	11,584	11,363
West Texas	63,711	64,764	54,924
Texas Gulf	26,202	25,547	25,493
Other Texas	34,006	33,451	31,958
Rocky Mountain	16,730	16,493	14,792
California	33,390	33,520	30,308
Foreign	8,158	7,001	5,696
Total	275,984	274,978	258,450

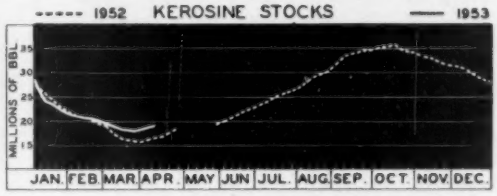
*Bureau of Mines.

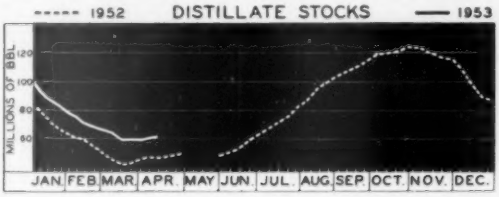


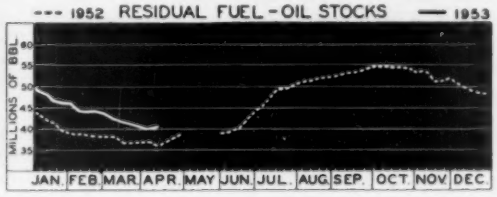










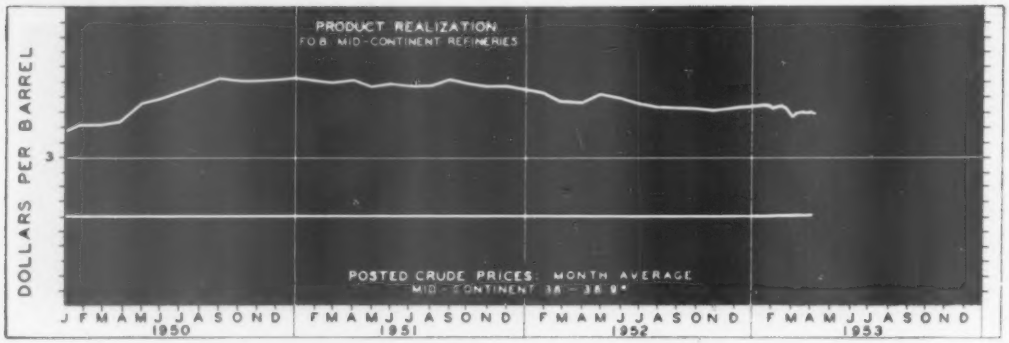


A.P.I. REFINERY REPORT, APRIL 11

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, April 1952 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	942	373.9	43.2	220.3	233.1	34,953	8,290	20,384	9,984	966	384.1	45.2	207.3	237.5
Appalachian:														
District 1	104	41.3	6.7	14.9	13.7	3,929	430	915	427	97	39.3	5.7	11.7	9.9
District 2	82	40.3	7.6	17.0	15.0	1,744	297	434	143	58	33.1	3.3	10.0	10.3
Ind., Ill., Ky.	1,144	600.8	77.6	180.6	153.4	36,488	3,623	8,886	3,411	1,201	625.8	66.8	215.6	174.3
Okla., Kans., Mo.	571	350.8	16.9	124.1	65.3	18,452	1,176	6,482	1,247	487	269.5	16.5	102.1	55.2
Inland Texas	241	158.7	10.3	41.7	27.9	6,220	332	1,053	898	251	166.6	14.1	38.5	38.5
Texas Gulf Coast	1,733	801.3	152.4	416.7	276.4	22,269	2,383	7,569	6,454	1,628	707.4	139.4	390.2	265.2
La. Gulf Coast	492	252.3	50.0	142.9	53.0	7,998	1,432	3,526	1,252	504	241.2	55.8	125.4	60.9
N. La. and Ark.	90	32.4	8.7	20.6	7.0	3,347	435	1,084	78	81	31.7	5.9	19.6	6.6
Rocky Mountain:														
New Mexico	20	11.6		2.9	3.9	142		30	31	18	10.6	0.5	2.9	4.0
Other Rocky Mtn.	188	96.0	5.1	40.1	36.8	6,906	296	1,596	892	175	83.3	5.7	36.3	35.6
California	1,098	455.3	7.1	176.8	360.6	18,759	381	9,013	15,846	969	402.7	7.0	152.2	355.4
Apr. 11, 1953	6,705	3,214.7	382.6	1,398.6	1,246.1	161,207	19,075	60,972	40,663	6,435	2,995.3	365.9	1,311.8	1,253.4
Apr. 4, 1953	6,965	3,200.1	372.1	1,452.7	1,227.6	162,249	18,760	59,723	39,998					
Apr. 12, 1952	6,315	3,077.4	388.6	1,344.6	1,249.4	157,781	17,017	48,494	35,880					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 — 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.29 for week ended April 4, $3.30 for previous week, and $3.36 for April 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of April 15, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12-12.75	10½-11
Premium gasoline, 86-88 octane	11¼-11½	13.125-14	11¾-12
42-44 w.w. kerosine	8¾-8¾	10.40-10.65	9
No. 2 straw fuel oil	7⅜-7⅜	9.40-9.65	8
No. 6 residual	$0.80-1.00	$2.00-2.25	$1.60-1.70

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.60	6.10	6.35

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	12-13
750 vis., No. 3-4 neutral	15-16
2,000 No. 5-6 neutral	17-18

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-22
200 vis., No. 3 neutral, 0-10 pp.	12-13

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	26.5
180 vis., 10 p.t. neutral	28.5

WAX
Mid-Continent

132-134 A.M.P.	5.5

IMPROVEMENT has been reported in local movement of gasoline in the southern part of the Group 3 area. Local farm demand in the northern part of Texas and southern Oklahoma is taking some of the pressure off the small refiners who depend largely on local demand as an outlet for gasoline production.

In the North Central states gasoline is still available at pipe-line terminals in small amounts at 10.375 cents a gallon plus pipe-line transportation. In most cases, this is semidistress gasoline caused by slight overstocking by some supplier at a particular terminal.

Heavy fuel in the Group 3 area has had a slightly firmer tone during the second week of April, but the change seems to be more a reflection of the increase in prices on the Gulf Coast than an actual firming of the normal northern markets for heavy fuel.

A price of $1.60 per barrel on the Gulf Coast nets a Group 3 refiner about 75 cents a barrel over transportation costs and terminaling charges of about $.15 a barrel.

An abnormal shortage in coastwise tankers for April has resulted in a slight firming of spot tanker rates for movement to the East Coast from the Gulf Coast and from Caribbean ports. For the second week of April, fixtures for dirty tankers in the coastwise trade were mostly at prices near the Maritime Commission base minus 25 per cent with one tanker reported taken at MC minus 20 per cent.

On the other hand tanker rates in the sterling area have not followed the recent rise in United States coastwise rates. Time charter rates in the sterling area for the April-September period are reported to be at the lowest level since 1950.

A gasoline price war at the service-station level has been reported in Denver. Some stations cut regular grade to about 20 cents a gallon.

CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif‡	Okla. homa, Kansas	Gulf Coast Tex.*	West Tex.†
14-14.9	$1.87	....		
15-15.9	1.93	....		
16-16.9	1.99	....		
17-17.9	2.05	....		
18-18.9	2.11	....		
19-19.9	2.18	....		
20-20.9	2.24	$2.25		$2.12
21-21.9	2.30	2.27		2.14
22-22.9	2.37	2.29		2.16
23-23.9	2.45	2.31		2.18
24-24.9	2.53	2.33	$2.56	2.20
25-25.9	2.61	2.35	2.58	2.22
26-26.9	2.69	2.37	2.60	2.24
27-27.9	2.76	2.39	2.62	2.26
28-28.9	2.83	2.41	2.64	2.28
29-29.9	2.91	2.43	2.66	2.30
30-30.9	2.97	2.45	2.68	2.32
31-31.9	3.04	2.47	2.70	2.34
32-32.9	3.12	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico.

Last general price change represented a 50-cent increase, effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Beauregard Parish	$2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.40
Southwest Pennsylvania	3.97
West Virginia	3.91
Illinois Basin	2.77

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

CLASSIFIED ADVERTISING

UNDISPLAYED CLASSIFIED 20c a word one issue. 10% Discount three or more consecutive issues. $4.00 minimum charge. Blind Box in our care nine words. Payable in Advance.

DISPLAY CLASSIFIED
$14.00 a column inch one issue . . .
10% Discount three or more issues.

Address Classified Advertising Material: The Oil and Gas Journal, P. O. Box 1260, Tulsa 1, Okla.

EQUIPMENT FOR SALE

1 OILWELL Steam Pump, 16¼ x 7⅝ x 20". This pump is in excellent condition, may be seen at Makin Drilling Company Yard. Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

FOR SALE: Lee C. Moore Cantilever Mast, 415,000# capacity, 9' steel substructure; Wilson Giant Double Drum Drawworks, powered by two WAK Waukesha; two pumps, 12" Emsco and 10" Dean Bros.; 17½" Rotary; National 120 ton Block; 60 ton B. J. Hook. Write Box 3246, Corpus Christi, Texas.

FOR SALE: 2,000' 6¼ Casing #1, $1.00. 750' 5½ Lapweld couplings #1, $1.35. M. J. Regan, Coffeyville, Kansas.

4242' NEW 17# Conversion Steel 5½" Casing 10c below list price; 6800' Good Used 3½" Drill Pipe $1.50 foot. Henry E. Kriegel, 1730 Commerce Building, Houston, Texas.

USED C-150 IDEAL MUD PUMP MOUNTED ON SKIDS WITH SHEAVE EXCELLENT CONDITION

Contact

Mountain Iron & Supply Company

714 Fourth National Bank Bldg.
Wichita, Kansas

FOR SALE

Complete steam drilling rig with 5- 350 lb. Broderick bollers, 144 ft. M and M Derrick, 11 ft. sub-structure, 23-9 Ideal draw works, 2 Ideal 20" pumps, 548 TC traveling block, HS-20½ rotary table, M3 swivel, excellent condition. Complete inventory upon request. Located in Calif.

THE SUPERIOR OIL CO.
Los Angeles, California

Stop Tong Breakage!

ARMITE DRILL COLLAR & TOOL JOINT COMPOUND

ARMITE LABS., 6609 Broad St., Los Angeles 1, Calif.
Petro. Industries Consultants, C.A. Caracas, Venez.

FOR SALE

New at East Chicago, Indiana, 3 BS&B Catalytic Converters Complete, 4' ID x 28' Ser. #2856T1, 2 and 3, Shells ⅜" thick ASTM-A 70 Flg. quality steel, Tube Sheets 10¼" thick same steel, cover plates 7⅜" thick ASTM-A 212 Fire Box quality, 48—5" OD x 28' x ⅜" Seamless Tubes A-106-39 Grade "B," Shell Design Pressure 60# PSIG., Test 90#. Tubes and Heads 1100# PSIG., Test 1650#. Full data and price on request.

CITIES SERVICE OIL
Patridge, Bartlesville, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: ZC 739 Fairbanks-Morse engines taken off for electrification purposes, and completely overhauled. Complete with clutch and sheave. Silvan Supply Company, Box 567, Drumright, Oklahoma.

FAILING 1500 heavy duty drill with 4½ x 6 pump, automatic pulldown, and mounted on International truck. Write P. O. Box 819, Longmont, Colo. Phone 1333.

TWO DOUBLE DRUM WILSON MOGUL SPUDDERS on steel skid, gasoline engine, butane heat exchanger, 60' single leg mast pole, dog house, electric plant, junk rack, tools. Practically new, excellent condition, ready to work. Located Grant Body and Equipment Company yard, Tulsa. Price $15,000.00 each. Phone 3-9191, Box 1896, Tulsa.

FOR SALE

Approximately 100 miles 6⅝" O.D. 18.97# Used Lapweld Line Pipe in single random lengths, plain ends beveled. This pipe is cleaned, primed and beveled and is offered FOB Indiana Shipping Point. Subject to inspection and acceptance at location. Prices are reasonable, with special consideration to dealers. We solicit your inquiries for all or part of this pipe, and for further information please write or call:

COMMERCIAL METALS COMPANY
P. O. Box 1046, Dallas, Texas
HUnter 4451

STANDARD PIPE SUPPLY COMPANY
P. O. Box 243, Houston, Texas
CHarter 6576

DAVIDSON PIPE COMPANY, INC.
2nd Avenue 50th St., Brooklyn 32, N. Y.
GEdney 9-6300

TEXAS PIPE & SUPPLY COMPANY
P. O. Box 1331, Houston, Texas
BLackstone 0101

EQUIPMENT FOR SALE

FOR SALE: One Barrel Type Ethyl Lead Plant, Hutex Oil & Refining Company, P. O. Box 2146, Houston, Texas.

FOR SALE: 8—Shriver 42"x42" cast iron Filter Presses, Plate & Frame type, 18, 27, and 54 chambers, 1" cake; 15—Sperry 18"x18" cast iron Filter Presses, 11 chambers; 2—#12 Sweetland Filters for 36 leaves on 4" centers. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 17-20 Park Row, New York 38, N. Y. BArclay 7-0600.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units, Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

FOR SALE

Complete National 100 Rig including 3 PTD-6 Superior Diesel Engines with dual fuel equipment, 136' Lee C. Moore Mast with 8' substructure, 2 C-350 Ideal Power Pumps, Ideal Type 548 TC Traveling Block, Type R3 Swivel, and Type MS-20½ Rotary Table. Excellent condition, priced reasonable, located in Montana. Complete inventory upon request.

Box G-341

The Oil and Gas Journal,
Tulsa, Oklahoma

FOREIGN A.P.I. PIPE

Immediate Delivery from Houston Stock

POPULAR SIZES, WEIGHTS and GRADES

No P.A.D. Tickets Required

Phone, Write or Wire for Prices

LUCEY PRODUCTS CORPORATION

TULSA, OKLAHOMA

624 So. Cheyenne **Phone LD - 204**

EQUIPMENT FOR SALE

FOR SALE: 80,000′ 4½ O.D. S.S. line, 60,000′ 3½ O.D. line, 60,000′ 6⅝ S.S. line. Lundquist Pipe & Supply Co., Phone 5-8850, Tulsa, P.O. Box 1215.

FOUR used Pumping Units, complete less motors. Suitable for 3,500′ wells. Four used pumping units complete less power. Suitable 5,500′ wells. E. A. Kelly, Box 861, Oklahoma City, Jackson 5-6407.

FOR SALE: At our Ponca City Refinery one (1) new 36″ ID x 37′ overall length, debutanizer tower, welded construction, ⅞″ head, ½″ ASTM-A-70 firebox shell, with ladders and platforms $2500.00. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

USED ROTARY, cable tools, and production equipment. E. A. Kelly, 3131 S.E. 29th Street, P. O. Box 861, Oklahoma City. Phone Jackson 56407.

FOR SALE: 800 ft. 12½ Seamless Casing in number 1 shape. Archie Newland, Yates Center, Kansas. Telephone 232.

FOR SALE

110,000′ 2⅜″ EUE, 4.70# New Smls Tubing Rg 2; 20,000′ 5½″ 14#, 15.5# & 17# New Smls PE; 3,000′ 10¾″ 32.75# New Smls Rg 2; 50,000′ 2⅜″ Line Pipe, Coated & Wrapped; 40,000′ 16″ OD X .312, API 5L X42 EW Rg 3. Many other items of new & used too numerous to mention. Write, wire or call Victor 6333, P.O. Box 7139, Houston, Texas.

FOR SALE

Gas Booster and Gasoline Plant complete. 300 h.p., 500# discharge. Engines rebuilt, Electric pumps, Tower and Gas Coolers. Fittings and instruments new. Storage tank and accumulators. Had less than 60 days operation. Terms to suit.

W. S. SMITH
205 Thompson Bldg. Tel. 2-5473
Tulsa, Oklahoma

FOR SALE

Wilson Mogul Draw Works—Pump Drive Two GK 145 Engines, $6,000.00. Wilson Atlas Draw Works—Pump Drive, Two LI 600 Cummings Diesel Engines, $24,500.00. Cardwell RL Draw Works, WAK Engine, Like New, $10,500.00. Wilson—Brewster—Ideco Core Units, $3,000.00 to $4,500.00.
Cecil Hilliard—Cardwell Representative
P. O. Box 20097—Houston 25, Texas

FOR SALE
at attractive prices

30,000 ft.—1″ Used Oil Well Tubing @ 12c ft.
10,000 ft.—1½″ Used SEAMLESS Tubing @ 20c ft.
50,000 ft.—2″ 4# and 4½# LW Used Tubing @18c ft. and up.
15,000 ft.—3″ 7.7# and 9.2# LW Used Tubing @ 50c ft. and up.
10,000 ft.—3″ Used Standard Pipe T&C (practically new).
6,000 ft.—5½″ OD 17# SEAMLESS Casing Range 2 and 3.
6,000 ft.—7″ OD 26# SEAMLESS Casing Range 1.
All above located our yards at Butler, Pa.
5,500 ft.—7″ OD 23# SEAMLESS Casing Range 2 and 3. Located at Bakersfield, California.
KEYSTONE PIPE & SUPPLY COMPANY
Butler, Pa. Phone 3714

SEPARATORS - HEATERS

3—24″x10′ B S & B Separators 1000# W. P. Price $700 ea.
3—30″ x 10′ B S & B Separators 125# W.P. Price $200 ea.
3—B S & B Flow Line Heaters 2000# Indirect Type, Size 2′ 2″ x 4′ 7″ x 9′. Price $250 ea.

All used in First Class Condition, located near Magnolia, Arkansas.

Please write or call:

Sam Siegel

306 Shelby Bldg., Shreveport, Louisiana
Phone 4-6512

EQUIPMENT FOR SALE

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE: R. L. Dubbledrum Cardwell fully equipped. Oklahoma City, Oklahoma, Melrose 8-5108.

FOR SALE: Cardwell, model RL, Beam type cable tool drilling unit. At present in operation in West Central Kansas. Complete inventory and price furnished on request. K & A Drilling Co., Phone 448R or Box 497, Ellinwood, Kansas.

FOR SALE: Complete booster station, two 90hp twin superiors, Happy radiators, High and low stage compressors, field scrubber, discharge scrubber, automatic controls; air compressor for starting; tin building 30′x40′. BENJAMIN GAS COMPANY, Box 228, Holdenville, Oklahoma, phone 514.

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

FOR SALE: 2—Platt Triplex 1¾″ x 4″ Vertical pumps. $1100.00 each F.O.B. New Harmony, Ind. Lynch Oil Company, New Harmony, Indiana.

FOR SALE—3 Worthington Gas Engines Model CG-6 360 H.P. at 400 RPM with Roots-Connersville blowers, good running condition. Contact: McKay-Davis Chemical Corp., Toledo, Ohio.

FOR SALE: One Cardwell double drum Mobilhoist with tools. James Oil Well Service, Ph. 3-2331 or P. O. Box 2196, Hobbs, New Mexico.

TWO — 60W — BREWSTER — 6000′— Well-Servicing Units, Complete, W/Rod & Tubing Tools. 8 x 7 Double Pole Mast, Truck Mounted, Ready to Work. Also, Allis-Chalmers, Muskogee, Wilson & Cardwell Skid Units. General Tool & Supply Co. P.O. Box 4387. Oklahoma City, Okla.

FOR SALE: 66 Wichita Drilling Rig. Complete tools, 6 cylinder Lersi Engine. Location, Mentone, Texas. Phone 1177 J, Pecos, Texas.

ROTARY CONTRACTORS—7″ OD type "A" B-J casing elevator, rated 175 tons capacity, slips for 5″ rotary drill pipe, liners for OWS pump 7″ x 16″ hard, No. 7 P pump—NEW MATERIALS special prices. PRINTY PIPE & SUPPLY, BOX 253, CUT BANK, MONT.

FOR SALE: Model R.L. 30-Drum Cardwell Spudder, Trailer Mounted, complete with all tailing-in tools. 7000 feet almost new 9/16-inch and ¾-inch lines. Will sell with or without tools. For full description and inventory, write Box G-406, The Oil and Gas Journal, Tulsa, Oklahoma.

LARGE MODEL K Cardwell with SRK Waukesha Engine with 55′, 8⅝ telescoping pole. Unit fully equipped with all tools and lines. All mounted on GMC 6 x 6. All ready to work. Price $9,000.00. J. L. Chew, Lyons, Kansas.

FOR SALE: Failing "1500" Holemaster powered by Chrysler industrial power unit, mounted on 1942 GMC truck. Rig complete with mud pump, 1000′ of "N" rods, drill collar and core barrel, slips, elevators, subs, etc. Equipment showing very little use. 1—1942 GMC water truck, A-1 condition. Price $14,000.00. For inventory contact P.O. Box 409, Del Rio, Texas.

87′ Lee C. Moore Cantilever Derrick located East Central Oklahoma. Drilled one well since complete overhaul by Lee C Moore. 4½′ substructure, steel floor, 4′ drop wings. $8,000.00. Box G-329, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 12 miles 4½ OD 10.79# 40′ double random lengths, beveled line. S & S Pipe & Supply Company, P.O. Box 2513, Phone 50-9287, Tulsa, Oklahoma.

USED EQUIPMENT for Sale: Shaffer & Regan Blowout Preventers, B.J. Hooks, Rotary Tables, Traveling Blocks & Mud Pumps. Used Drill Pipe, all Range 2, 3½″ API FH w/5″ OD Joints; 3½″ API IF w/ 4¾″ OD Joints; 4½″ API FH w/Flash Weld & Conventional Joints. Phil A. Cornell, Box 5113, Farley Station, 4200 West Reno, Oklahoma City, Oklahoma. Phone WI 2-5660.

EQUIPMENT FOR SALE

FOR SALE—Model 5000 Franks Skid Type Rotary complete with 96 foot derrick; two 200 hp. Diesel Motors compounded; 7¼ x 12 Gardner-Denver Pump; with or without 5000 feet 4½″ Drill Pipe. Located Central Nebraska. Box G-415, The Oil and Gas Journal, Tulsa, Oklahoma.

1500′ GOOD used 2⅞″ drill pipe. M. Mazzarino, Staunton, Ill.

FOR SALE: 1 Worthington 4″ x 18″, 4-8 chrome block, horizontal, duplex, double plunger, enclosed frame hot oil fitted power pump, driven by Worthington 12½ x 14″ horizontal double acting steam engine, with some spare parts for engine. 1 Worthington 5½″ x 18″, 4-8 chrome block, horizontal, duplex, double plunger, enclosed frame hot oil fitted power pump, with some spare parts; driven by Worthington 12½ x 14″ horizontal, double acting steam engine, with some spare parts. Equipment second hand, in good condition; spare parts new. American Liberty Oil Company, Box 1011, Mt. Pleasant, Texas.

FOR SALE: Northern Pump Spudder (equivalent to Bucyrus 36L) with new motor and completely reconditioned throughout. Price of $8750.00 includes stem, bailers, bits and miscellaneous equipment. Gordon Hurd, Midland Savings Building, Denver, Colo.

G-D WATER pumping outfits, traveling blocks, crown blocks, swivels, elevators, overshots, B-R drive bushings, 4½″ drill pipe, pumping engines, etc. G & H Supply Company, Box 4052, Oklahoma City.

FOR SALE: At our Lacy gasoline plant, Seminole County, Oklahoma, 1 used Braun portable distillation unit. Size G, Serial #7190 complete with or without building Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FOR SALE: One Sullivan 200 RTA drill mounted on tandem White Truck. Rig powered by two Buda L525 Motors. 5 x 8 Gardner Denver mud pump also mounted. Two derricks, one 45 ft. and one 65 ft. Drill has worked less than six months. 3,000 miles on truck. Priced for immediate sale. Located at 3820 North West 39th Street in Oklahoma City. Phone Windsor 2-4226. Young Exploration Company.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WANTED: Three engine compound for Wilson Titan drawworks. Makin Drilling Company, Box 1628, Phone 3-3141, Hobbs, New Mexico.

WANTED: One Thrible Jack-knife and substructure. No Junk Wanted. Makin Drilling Company, Phone 3-3141, Hobbs, New Mexico.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

ONE OR MORE complete Hyd-Robot Podbielniak low temperature distillation units wanted. Box G-417, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED TO BUY: Marginal or abandoned oil properties in Eastern United States. Give complete details first letter. Box G-432, The Oil and Gas Journal, Tulsa, Oklahoma.

NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WANTED
GAS COMPRESSORS

Gas engine driven, two or three compressor throws. Total approximately 900 hp. in two or three machines. Give full particulars in first letter. Address replies to:

P. O. Box 13022, Houston 19, Texas

EQUIPMENT WANTED

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

HELP WANTED

SOUTH AMERICA. These jobs are with one of the better oil companies. Our fee paid. Mechanical Engineer — graduate, no experience required. Petroleum Engineer—graduate, no experience required. Chemical Engineer—graduate, no experience required. Mud Technician—two or more years' experience, single. Accountant—college graduate, Accounting major, single. All information confidential and should be mailed to CHAS. J. LOVELESS PERSONNEL SERVICE, 616 S. Main, Tulsa, Oklahoma. Phone 3-5168.

SEISMIC PERSONNEL needed for United States and Canada by well known and expanding contract geophysical company. Address Box E-863, The Oil and Gas Journal, Tulsa, Oklahoma.

SUBSURFACE GEOLOGIST-MICRO-PALEONTOLOGIST

To work on deep wells in Saudi Arabia, making lithologic and faunal logs from cores and cuttings, interpreting electric logs, and working on field and regional stratigraphic studies. Salary dependent upon experience and qualifications.

Write giving personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR, BOX OGJ

ARABIAN-AMERICAN OIL CO.
505 Park Ave., New York 22, N. Y.

PROCESS DESIGN ENGINEERS

A major engineering and contracting company requires Process Design Engineers with M.S. degrees in Chemical Engineering with 1 to 3 years of experience in process design of oil refinery and petrochemical plants.

Excellent opportunities for advancement and professional growth.

Reply giving details of education, experience and salary requirements. Replies will be held in strict confidence.

ARTHUR G. McKEE & CO.
2300 Chester Ave.
CLEVELAND 1, OHIO

HELP WANTED

GAS ENGINEER

Independent producer of oil and gas needs experienced gas engineer to take charge of operation of gas properties and to assist with all production problems involving gas. Man filling this job needs experience in field operation of gas distillate wells, small field compressor installations, and gas-lift installations. Give resume of experience, enclosing small photograph if possible. Box G-436, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

CHEMICAL or Petroleum Engineer for work in natural gas and gasoline field with a progressive independent in Permian basin area of West Texas. Experience desirable but not required. Salary commensurate with ability. Include education and complete brief of experience with salary expected in first reply. Replies confidential. Box G-419, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM GEOLOGIST: About 35 years of age who has had experience in Permian and Pennsylvanian areas, as in West Central and North Texas, Oklahoma and Kansas, both subsurface and surface. Will headquarter in Fort Worth but must be willing to be away from home a reasonable amount of time. Give details of education, experience and salary expected. HILL & HILL, Attention: R. R. Thompson, Geologist, 1325 Forth Worth National Bank Building, Fort Worth 2, Texas.

PETROLEUM ENGINEER

Required by independent company for foreign assignment. Responsibilities initially involve personally conducting comprehensive reservoir tests on new field and thereafter preparing and directing complete field development program. Minimum five years field experience. Liberal salary and allowances. Single quarters furnished. Please reply to Box G-434, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION RESEARCH ENGINEER

Experienced Research Engineer to direct and conduct fundamental and applied research in the field of reservoir mechanics. Ph.D. or equivalent. Position permanent. Salary open.

GULF RESEARCH & DEVELOPMENT COMPANY
P. O. Drawer 2038, Pittsburgh 30, Pa.

ESTIMATORS

Young engineers capable of mechanical estimating for construction of refineries, steam power and similar industrial projects. Must have some field experience.

Considerable weight given to ambition, intelligence, and interest in estimating and cost analysis.

BECHTEL CORPORATION
220 Bush Street
San Francisco, California

OIL REFINING AND GASOLINE PLANT SUPERINTENDENT

Required by

TEXAS GAS CORPORATION

Apply to

Russell M. Riggins, Pres. or Hugh V. Miller, Vice Pres.
Prudential Bldg., 17 Floor Winnie, Texas
Houston 25, Texas

HELP WANTED

CANADIAN Sales Representative contacting pipe-line companies and contractors for pipe-line equipment and materials. Box G-411, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS & GEOLOGISTS: Rocky Mtn. positions with Majors and Independents. Need specialists in drilling, production, reservoir. Also process engrs. and refinry supts. Professional Placement Service, 516 University Bldg., Denver, Colorado.

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

DIVISION GEOPHYSICIST — Position open. Good salary. Require well qualified geophysicist, with geological education or training, and at least three years' experience in Permian Basin. Write:—Union Oil Company of California, 200 Wilkinson-Foster Building, Midland, Texas. Attention:—Mr. H. L. Swords.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 434 Frick Bldg., Pittsburgh 19, Pa.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

EXPERIENCED LEASE Pumper and Production man, married, age 30, wishes to make connection with progressive firm. Fully qualified, dependable. Would move to any location. Box G-431, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer: 8 years varied production, drilling and workover experience. Desires change. Will consider any location. Box G-414, The Oil and Gas Journal, Tulsa, Oklahoma.

COLLEGE graduate, age 39, married, 15 years experience drilling and production management with contractors and majors Gulf Coast Area. Desires permanent position with growing organization. Box G-405, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION Superintendent — Desires change. 15 years' experience West Texas and New Mexico. Interested Lea County, New Mexico, or adjacent area. Box G-407, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER: Discharged from Air Force soon. Married, age 28, education B.S. Chemistry. Desire permanent position. Box G-439, The Oil and Gas Journal, Tulsa, Okla.

SEIS. Party Chief: Age 30, 6 years experience West Texas, offshore. Desires geophysicist position with independent. References. Box G-438, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: Experienced in major company administrative and field land operations. College and legal education and licensed attorney. Desires change to expanding independent organization for responsible assignment. Box G-437, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, 32, five years Rocky Mountain and two years Mid-Continent—Gulf Coast major company experience wants job with independent company Rocky Mountain Area. Box G-440, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN, 6 years experience, age 29, veteran. Desires work with active company in South or West Texas. P.O. Box 331, Midland, Texas.

CHEMICAL ENGINEER with 6 years supervisory experience in mud control and drilling problems, desires job with good future and possible executive position. Married, age 34. Box G-433, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GEOLOGIST—age 33, married, six years Gulf Coast experience. Desires immediate employment any location. Box G-420, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER. Five years drilling, production, and reservoir engineering experience with major on Gulf Coast. Looking for opportunity and responsibility with independent. Box G-426, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, employed, 8 years experience with major in field, staff, and reservoir in Gulf Coast and East Texas desires position with independent. Box G-427, The Oil and Gas Journal, Tulsa, Oklahoma.

RUSTY MACHINERY SALESMAN: Being released from duty as Captain of Navy ship 15 June. Age 30, Annapolis graduate, experienced with drilling equipment. Can sell, advertise or administrate. Box G-428, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico

DESIRE bulk plant. College graduate, refinery experience. Prefer west, near city. Box G-435, The Oil and Gas Journal, Tulsa, Oklahoma.

CONSTRUCTION ENGINEER: Now located in middle east. 15 years experience in heavy construction and oil handling, interested in contacts leading to overseas contract. Available 5 months. Speaks Spanish, French, and Arabic. Box G-441, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

PUBLICATIONS

OUT-OF-PRINT Government Geological Publications and files of Technical Journals our specialty. Inquiries welcomed. CANNER'S (Dept. Ogj), Boston 19, Mass.

REAL ESTATE

SECLUDED WONDERLAND

750 Acres near Los Angeles. Elev. 5500'. Beautiful Pinon Pines, 3 furnished homes, other buildings. Domestic water from springs. Superb view Mojave desert. An Outstanding Property at $50,000.00. terms. Fruhling Realty, 2234 E. Broadway, Long Beach, Calif.

COMMERCIAL Sites (100 x 235 ft.), Residential lots (75 x 140 ft.) on Highway 83 just north of Minot (restricted to new construction). L. A. Joyce, Box 575, Dial 37-127, Minot, North Dakota.

OIL OFFICES AVAILABLE SOON

In Roswell, New Mexico, Corner First and Main, 14 offices, can arrange for 20 if needed. See or write

E. P. MALONE
Care of Roswell State Bank
Roswell, New Mexico

FOR SALE—MAPS

WILDCAT MAPS

PERMIAN BASIN of W. Tex. and S.E. N. Mex.
or
WILLISTON BASIN—U. S. and Canada
Complete coverage, up-to-date wildcat operations. Over-all dimensions 26" x 28". **$3.50 per copy.**

Midland Map Company
Dept. A, Box 1211, Midland, Texas

LEASE AND DRILLING BLOCKS

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

FOR SALE: 155 acres on promising structure. Producing oil and gas wells on north and west. John Harlow, Louisburg, Kans.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FOR SALE: Offset lease to 18 million well new Elk County, Pa., field. Call or write Walter D. Price, D. D. S., 238½ Capitol Street, Charleston, West Virginia, Phone 3-8213.

HAVE six sections Federal lease, rent paid three years, North, East and South of deep test now drilling near Florence, Pinal County, Arizona. Close enough for excellent speculative opportunity. Box 842, Scottsdale, Arizona.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

WANTED
DRILLING DEALS
PRODUCTION

WILL BUY SETTLED OR NEW DISCOVERY PRODUCTION
WILL DRILL WILDCAT OR PROVEN DEALS
in New Mexico — Oklahoma — Texas
Williston Basin—Rocky Mountain

Will give quick reply. Send complete information to Box G-423, The Oil and Gas Journal, Tulsa, Oklahoma.

BIG FRESH OIL BOOM IN LEASES

in Eastern North Dakota — Walsh and Nelson Counties. Wire or write for locations and prices.

F. W. Dyer
1835 Champa, Denver, Colorado

ROYALTIES

PRODUCING ROYALTY and overrides for sale. Wire-write-call for particulars. JACK EAGLE, 706 City Natl. Bldg., Okla City, Okla. REgent 6-7027.

QUICK CASH: Producing royalties, Overrides or Production . . . no delay. Phone 72-4533, Robert L. Kinkaid . . . P.O. Box 26, Tulsa, Oklahoma.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

ROYALTIES WANTED
Producing Royalties
High Grade Only
Send Full Particulars
Address

C. C. HARMON
719 World Bldg., Tulsa, Okla.
P.O. Box 2151

FOR RENT OFFICE SPACE

AIR CONDITION OFFICE SPACE. 8,000 Sq. Ft. Two blocks from Post Office. Also Warehouse Space. Hall Investment Company, 224 East 4th Street, Tulsa, Oklahoma. Phone 2-6167.

PRODUCTION WANTED

INDEPENDENT Oil Company desires to purchase production amounting to at least 1,000 barrels per day. Submit full details, together with competent engineering report. Confidential. Box G-404, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

DO YOU Want Capital? Then for a substantial interest in your producing oil and/or gas properties without your risking a loan-squeeze or sacrifice-sale will you accept adequate working capital to meet obligations, drill more wells, or acquire more producing leases? Box G-429, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING DEAL WANTED

Have spudders, labor, cash and repressuring experience. Would like to make drilling deal on shallow repressuring project for part cash and interest.

Box G-403, The Oil and Gas Journal, Tulsa, Oklahoma

LEASE AND DRILLING BLOCKS

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6435 Delmar Ave., St. Louis 5, Mo.

★-ELIDA, NEW MEXICO-★

Walter Winchell broadcasts the largest oil pool in the WORLD is to be uncovered near Elida, New Mexico. It is news to me! Here I sit with my 'ears aflopping and my arteries ahardnin' owner of the 2240 acre Federal Lease on the crest, on the crest of an ENORMOUS magnetic high which has been checked by gravity surveys of three major oil companies and A SEISMIC HIGH EXTENDING ACROSS MY SPREAD WITH CLOSURE ON ME. West—about ten miles from Elida. NE Chaves County. Townships 3 & 4 South, Range 29 East. (Pull out the ownership maps.)

Gulf, Skelly, Magnolia, Lion, Houston, Frank Buttram, Atlantic, Sinclair, Tide Water, Phillips, Lario, Spartan, Ohio et al. are neighbors.

Deep tests other directions from Elida have defined this REEF.

None of my good neighbors seem in any hurry to pop this vast tank of energy. I would shore like to get in a contributing mood for The Damon Runyon Cancer Fund. "WHATA I DO NOW," Walter?

GEORGE C. MEDARY
Phone 3459M **1714 W. Juniper St.** **Roswell, New Mexico**
Photostat map on request.

ADVERTISERS

Allis-Chalmers Mfg. Co. 28, 29
Alloy Steel Products Co., Inc. 178
Alten Foundry & Machine Works 210
Aluminum Co. of America 196
American Car and Foundry Company 81
American Hoist and Derrick Company 209
American Iron & Machine Works Co. 147
American Locomotive Company 78
American Manufacturing Co. of Texas 4
Anderson Co., V. D. 221
Armco Drainage & Metal Products, Inc. 110
Autocar Company, The 27
Avondale Marine Ways, Inc. 16

B and W, Inc. 208
Baker Oil Tools, Inc. 94
Baroid Sales Division, National Lead Company 19, 20
Beaumont Iron Works Co., Subsidiary of American Locomotive Co. 91
Bemis Bro. Bag Co. 85
Bendix Aviation Corporation 78
Bethlehem Steel Co. 77
Bovaird Supply Co., The 52
Bowen Co., S. R. 214
Brewster Company, Inc., The 217, 218
Brooks Paper Company 135
Brown & Root, Inc. 113
Butler Manufacturing Co. 215
Byron Jackson Co. PB Division 191

Cabot Shops, Inc. 149
Campbell Chain Company 183
Cardinal Chemical, Inc. 39
Cardwell Mfg. Co., Inc. 144, 145
Carter Company, Inc., S. C. 17
Cast Iron Pipe Research Association 189
Cavins Co. 201
Chain Belt Co. 186
Charles Machine Works 184
Chicago Bridge & Iron Company 109
Classified Advertising 229, 230, 231, 232
Cleveland Worm & Gear Co., The 84
Consolidated Engineering Corporation 31
Core Laboratories, Inc. 30

Darling Valve and Mfg. Co. 194
Dayton Rubber Company, The 130
Dean Brothers Pumps, Inc. 189
Delta Engineering Sales Co. 194
Denison Engineering Company, The 79
Deublin Company 206
Diamond Alkali Company 34
Dowell Incorporated 96
Drilling & Service, Inc. 223
Drilling Specialties Co. 198
Duff-Norton Mfg. Co. 73
du Pont 3

Eastman Oil Well Survey Company 21
Empire Trust Company 213
Enardo Manufacturing Co. 203

Fairbanks, Morse & Co. 2
Farrel-Birmingham Co., Inc. 47
First National Bank & Trust Co. of Tulsa, The 188
First National Bank of Shreveport, The 224
Fisher Research Lab., Inc. 205
Flexitallic Gasket Company 224
Fluor Corporation, Ltd., The 54
Ford Motor Company 41
Fort Worth National Bank, The 201
Four Wheel Drive Auto Co., The 55
Frontier Chemical Company 196

Gates Rubber Co., The 234
General American Transportation Corporation 127
General Descaling Co., Ltd. 187
Goodall Rubber Company 185
Goodyear Tire & Rubber Company 9
Gordon Co., Claud S. 184
Grancell, I. H. 190
Graver Tank & Mfg. Co., Inc. 38
Grinnell Company, Inc. 7
Guiberson Corporation 86
Halliburton Oil Well Cementing Co. 12, 75
Harbison-Fischer Mfg. Co. 181
Harco Corporation, The 22
Harnischfeger Corp. 182, 183
Harper Company, H. M. 46
Helicoid Gage Division, American Chain & Cable Co. 83
Herold, Inc., John S. 212
Hewitt Rubber Division, Hewitt-Robins, Incorporated 24, 25
Homestead Valve Manufacturing Co. 51
Houston Contracting Co., Ltd. 184
Huey & Co., S. E. 188
Hughes Tool Co. Back Cover

Hydril Company 172
Independent Exploration Co. 74
Inferno Co., The 190, 205
Insley Manufacturing Corporation 179
International Harvester Co. 120
International Nickel Company, Inc., The 43

Jones & Laughlin Steel Corp. 36, 37
Jones & Laughlin Steel Corporation, Supply Division 26
Jones Company, The S. M. 6

Kelley Company, Ben F. 216
Kennametal, Inc. 80
Kinzbach Tool Co., Inc. 221
Koppers Company, Inc. 30
Lane Plating Works 216
Lane-Wells Company 15, 44
Layne & Bowler, Inc. 64
Lonergan Co., J. E. 187
Lufkin Foundry & Machine Co. 88

Magnet Cove Barium Corp. 202
Maintenance Engineering Corp. 65
Manco Mfg. Co. 196
Manhattan Rubber Division, Raybestos-Manhattan, Inc. 50
Manning, Maxwell & Moore, Inc. 72
Marley Company, Inc., The 13
Mayo Hotel, The 188
McCord Corporation 193
McCullough Tool Company 168
Metal Goods Corporation 82
Minneapolis-Moline 63
Mission Mfg. Company 151, 152
Moon Brothers, Ltd. 212
Moore Corporation, Lee C. 88, 89
Morse-Starrett Products Company 211
Muldrow Aerial Surveys Corp. 209
National Airoil Burner Co., The 193
National Bank of Commerce of Houston 116
National Bank of Tulsa 18
National Supply Co., The 32, 33
Nordstrom Valve Division, Rockwell Manufacturing Company 70
Oakite Products, Inc. 224
Oil and Gas Journal, The 213
Oil Well Mfg. Corp. 137
Okadee Company 180
Otis Pressure Control, Inc. 207
PB Division Byron Jackson Co. 191
Peerless Pump Division of Food Machinery & Chemical Corporation 11
Peerless Supply Co., Inc. 213
Pelton Water Wheel Co. 129
Petroleum Distributing Co. 192
Petroleum Rectifying Company 59
Pipe Line Engineering & Equipment Co. 188
Radio Corporation of America 45
Rasmussen Mfg. Co. 189
Ratigan, Inc., J. P. 40
Raybestos-Manhattan, Inc., Manhattan Rubber Division 50
Reda Pump Company 208
Reed Roller Bit Company Front Cover
Republic Rubber Division of Lee Rubber & Tire Corp. 87
Republic Steel Corporation 48, 49
Reynolds Metals Company 14
Rockwood Sprinkler Co. 61
S & R Tool & Supply Co. 221
Schlumberger Well Surveying Corp. 53
Scott-Rice Company 192
Security Engineering Co., Inc. 92
Shaffer Tool Works 142
Smith Corporation, A. O. 57, 170, 208
Southern Mill & Mfg. Co. 56
Spang & Co. 220
Spartan Aircraft Company 42
Sperry-Sun Well Surveying Co. 146
Standard Oil Co. of California 35
Standard Oil Company 58
Standco Brake Lining Co. 192
Steel Forgings, Inc. 188
Sun Shipbuilding & Dry Dock Company 62
Taylor Chain Co., S. G. 90
Templeton, Kenly & Co. 192
Thermoid Company 176, 177
Thomas Flexible Coupling Co. 219
Thompson Tool Co. 222
Thornhill-Craver Co. 141
Trostel Packings, Ltd., Albert 195
Tulsa Paper Co. 213
Union Wire Rope Corporation 175
Unit Rig & Equipment Co. Inside Front Cover

Wagner Electric Corporation 69
Walworth Co. 5
Waukesha Motor Company 71
Web Wilson Oil Tools 10, 205
Welex Jet Services, Inc. 133
Well Equipment Mfg. Corp. 138
Wheland Company, The 166
Wichita Falls Foundry & Machinery Co., Inc. 139
Williamson, Inc., T. D. 8
Winpower Mfg. Co. 205
Worthington Corporation 65, 67
Wyatt Metal & Boiler Works Inside Back Cover

Young Radiator Company 60

Karry Krane Service to Be Available at I.P.E.

Again this year, as in past shows, Hyster Co. will make its "Karry Krane service" available to exhibitors at Tulsa International Petroleum Exposition.

Exhibitors and visitors will remember the giraffe-like "courtesy crane" hurrying around the grounds, into and out of exhibition buildings, handling lifting and transporting jobs for the overworked exhibitors and show personnel. Though not one of the exhibits itself the courtesy crane was donated along with operator for "workhorse" duty on the grounds as a service to the other exhibitors.

One of Hyster Co.'s regular line of materials-handling equipment, the courtesy crane is actually a Karry Krane, a versatile tool that is used widely in the oil and gas industry as well as in numerous other types of work. This year the Karry Kane will be brought to the exposition from the showrooms of C. H. Collier Co., of Dallas and Houston, and put to work helping out exhibitors free of charge.

This year, in addition to furnishing the courtesy crane, two of Hyster's Co.'s prominent dealers in the area will also maintain booths to show off latest equipment and offer visitors attending the show the benefit of their experience in solving materials-handling problems in various types of plants.

The Hyster dealers taking part in the show this year are Machinery & Supplies Co., Inc. of Kansas City, Mo., and C. H. Collier Co.

This Karry Krane to aid exhibitors at Tulsa I.P.E.

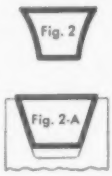
WHY
Gates V-Belts Wear Longer-

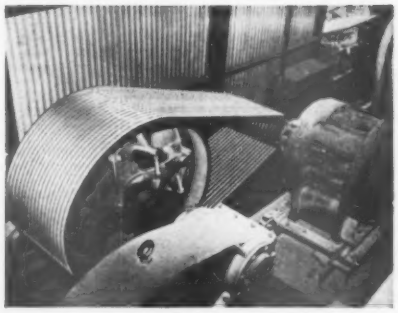
The CONCAVE SIDE (U.S. Patent No. 1813698) is what gives the Extra Wear!

Take any *straight-sided* V-Belt (Fig. 1) and bend it as it bends in going around its pulley. You will clearly see its sides *bulge out* (Fig. 1-A). These sides therefore press *unevenly* against the V-pulley and this causes extra wear at the point shown by arrows (Fig. 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2).

You will see the precisely engineered CONCAVE SIDES fill out to an exact fit in the sheave-groove (Fig. 2-A). The sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the Gates Vulco Rope—and this means longer belt *life* and *lower* belt *costs* for you.





Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the Gates Vulco Rope!

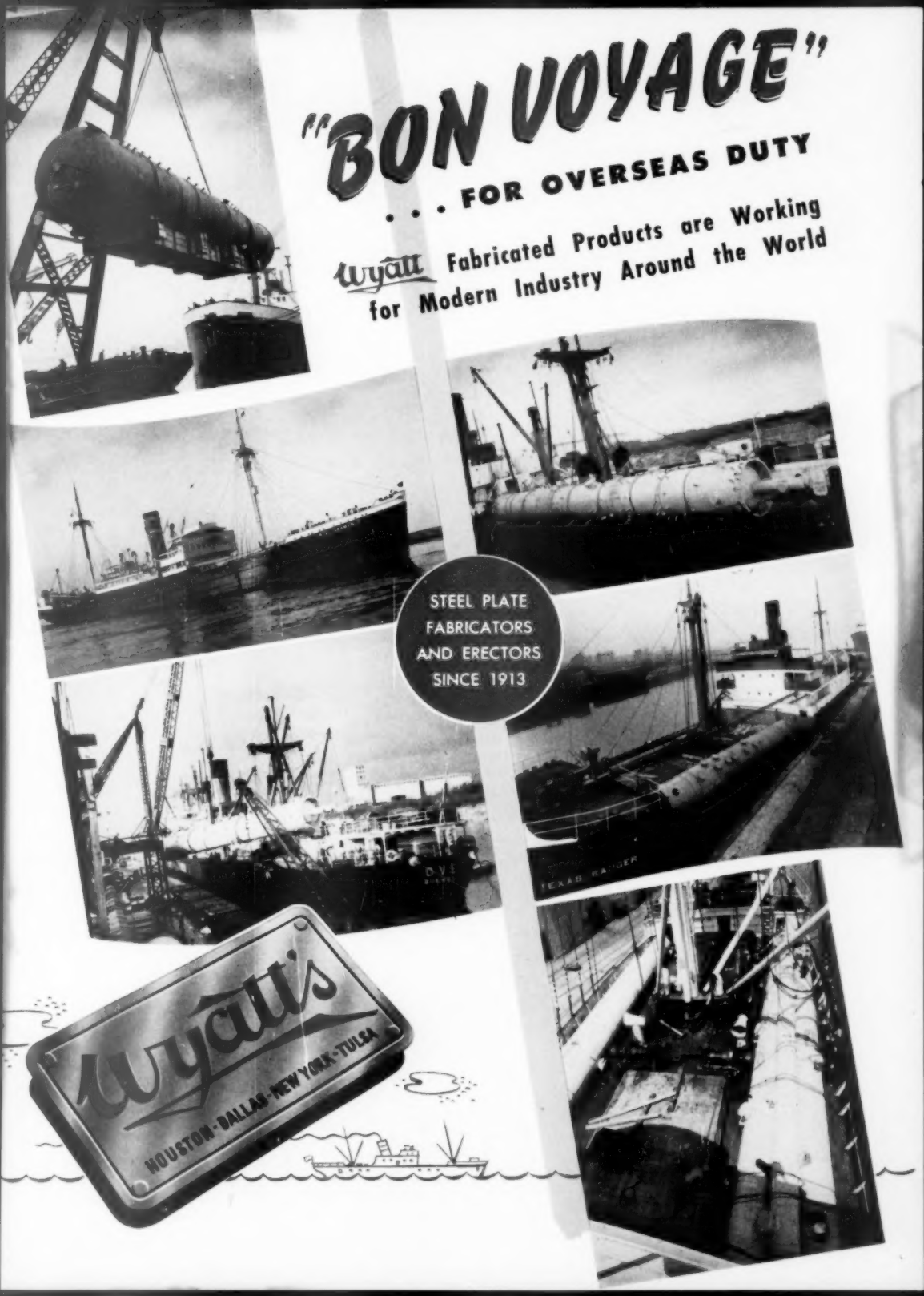
Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-533

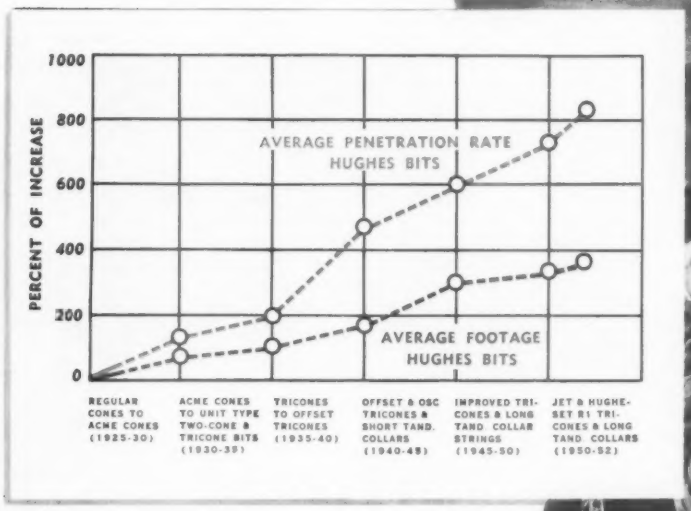
V-Belts—Hose
Molded Rubber Goods
for industry
World's Largest Maker of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.


"BON VOYAGE"
. . . FOR OVERSEAS DUTY
Wyatt Fabricated Products are Working for Modern Industry Around the World
STEEL PLATE FABRICATORS AND ERECTORS SINCE 1913
TEXAS RANGER
Wyatt's
HOUSTON-DALLAS-NEW YORK-TULSA

DRILLING INDUSTRY TEAMWORK PRODUCED THIS ACHIEVEMENT


PERCENT OF INCREASE
1000
800
600
400
200
0
AVERAGE PENETRATION RATE HUGHES BITS
AVERAGE FOOTAGE HUGHES BITS
REGULAR CONES TO ACME CONES (1925-30)
ACME CONES TO UNIT TYPE TWO-CONE & TRICONE BITS (1930-39)
TRICONES TO OFFSET TRICONES (1935-40)
OFFSET & OSC TRICONES & SHORT TAND. COLLARS (1940-45)
IMPROVED TRI-CONES & LONG TAND. COLLAR STRINGS (1945-50)
JET & HUGHE-SET R1 TRI-CONES & LONG TAND. COLLARS (1950-52)

The above chart is more than a record of the performance of Hughes rock bits. The increase in penetration rate of approximately 800% and almost 400% increase in footage drilled per bit, during the past 27 years, reflect the achievement of the industry.

Better bit designs alone could not have accomplished this. It took the know-how and experience of the *drilling contractors* and *drilling departments of the oil companies,* and the cooperation of the entire drilling industry to develop the techniques and equipment that have helped produce this outstanding performance record.

As a result of this combined industry effort, improved bit penetration and footage drilled per bit have partially off-set rising drilling costs. We are proud of the important part that HUGHES has played in this achievement.